

BOTANICAL ABSTRACTS

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J. R. SCHRAMM, Editor-in-Chief
Cornell University, Ithaca, New York

Vol. VIII

MAY, 1921
ENTRIES 1-760

No. 1

AGRONOMY

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(See also in this issue Entries 74, 77, 87, 237, 238, 239, 329, 355, 510, 529, 552, 553, 613, 621, 630, 677, 678, 679, 693, 724)

1. ADKINS, D. M. *The soya-bean problem*. *Sci. Prog.* [London] 15:445-451. 1921.—A brief account is given of the history, economic value, and methods of cultivating the soya-bean.—*J. L. Weimer*.

2. ANONYMOUS. *Cotton for automobile tires*. *Sci. Amer.* 122:603. 2 fig. 1920.—A brief account of the growing of long-fiber cotton in the Salt River Valley of Arizona.—*Chas. H. Otis*.

3. ANONYMOUS. *Cyprus grown tobacco*. *Cyprus Agric. Jour.* 14, 15:148-149. 1919, 1920.—Smyrna and Cavalla leaf tobacco produced at Nicosia, Cyprus, contained rather large amounts of nicotine and nitrogen, while the ash had a low percentage of potash. It is believed that with proper knowledge, skill, and care a tobacco leaf can be produced in Cyprus that could be sold in the London market at satisfactory prices.—*W. Stuart*.

4. ANONYMOUS. *Failure of potatoes in Cyprus*. *Cyprus Agric. Jour.* 15:214. 1920.—Potato growers in Cyprus suffer their chief losses to the summer potato crop, which is normally harvested in May or June. The intense heat of that period makes it difficult to keep the tubers.—*W. Stuart*.

5. ANONYMOUS. *Early potatoes at Wisley 1919*. *Jour. Roy. Hort. Soc.* 45:360-367. 1919.—Report is made of a test of 121 stocks of early potatoes. The awards of the fruit and vegetable committee and a classification with brief descriptions are given.—*J. K. Shaw*.

6. ANONYMOUS. *Fodder plants*. *Cyprus Agric. Jour.* 15:204-206. 1920.—The article is devoted to a brief description of some fodder plants: The Moha [Hungarian millet], Sudan grass, buckwheat, white French millet, prickly comfrey, and banana stems.—*W. Stuart*.

7. ANONYMOUS. *Periods for which seeds retain their germinating power*. *Cyprus Agric. Jour.* 15:213. 1920.—It has been found that oats retain their germinating power 2 years; buckwheat 2-3 years; hemp 3 years; wheat and barley 3-4 years; rye, carrots, and lucerne 4 years; beans, peas, and flax 5 years; cabbage, 5-6 years; and beets 6-7 years.—*W. Stuart*.

8. ANONYMOUS. [Program of work in progress at the cotton experiment stations of the Chinese Cotton Mill Owners' Association.] Hua-Shang-Sha-Chang-Lien-Ho-Hui-Ki-Kan [China Cotton Jour.] 21: 229-247. 1920.—Reports for the fiscal year ending 1920 of the work at 1 central experiment station and 16 sub-stations with a total area of 1300 mows (Chinese acres). The features reported are: Location, date of establishment, soil conditions, procedure of work, training of students, varieties of cotton, diseases and pests, and results.—*Chunjen C. Chen.*

9. ANONYMOUS. Sulphur as a fertilizer for potatoes. Cyprus Agric. Jour. 15: 192. 1920.—The experiments noted were conducted on a farm in Chili, the soil of which was rich in organic substances. The application of sulphur on one plot of potatoes gave an increase over the plots without sulphur of 72 per cent and on another plot an increase of 65 per cent.—*W. Stuart.*

10. ANONYMOUS. [Rev. of: HARRIS, F. S. The sugar-beet in America. Rural Science Series. xviii + 342 p. Macmillan Company: New York, 1919.] Sci. Prog. [London] 14: 511. 1920.

11. BARBER, C. A. Millets for fodder on sugar estates. Internat. Sugar Jour. 22: 684-686. 2 pl., 4 fig. 1920.—This third paper gives additional descriptive notes and data on three of the lesser millets which are most productive: Bulrush millet (*Pennisetum typhoides*), Italian millet (*Setaria italica*), and Ragi (*Eleusine coracana*).—*C. Rumbold.*

12. BORNEMANN. Kohlensäure und Pflanzenwachstum. [Carbonic acid and plant growth.] Mitteil. Deutsch. Landw. Ges. 35: 693-695. 1920.—More CO₂ is evolved from well manured and well cultivated land than from that unmanured or uncultivated. The purpose of the present experiments was to determine whether the larger yields secured under good cultivation were due in part, at least, to the larger amounts of CO₂ available to the crop. A portion of the garden was laid out into 12 beds, 6 of which were provided with piping by which CO₂ was supplied. Peas, oats, barley, potatoes, onions, and kohlrabi were grown. The plants in the beds supplied with CO₂ were later, larger, and more productive than those in the check beds. The following table gives some of the data presented:

	WEIGHT OF CROP IN GRAMS		PER CENT GAIN
	Without CO ₂	With CO ₂	
Peas.....	532	766	44.1
Oats.....	706	1191	68.7
Potatoes.....	2160	3080	42.6
Onions.....	621	1924	210.0
Kohlrabi (KG).....	11	13	18.2

—A. J. Pieters.

13. CRAFTS, H. A. What about our wheat production? Sci. Amer. 123: 376, 391. 1920.—Use of good crop rotations to increase the yields of wheat and other crops is discussed. Alfalfa and sugar beets can be utilized for their favorable effects.—*Chas. H. Otis.*

14. DEAN, H. K. The work of the Umatilla Reclamation Project Experiment Farm in 1918 and 1919. U. S. Dept. Agric. Dept. Circ. 110. 3-24, fig. 1-6. 1920.—Data are presented on: Comparative importance of the alfalfa crop during the 9-year period, 1911-1919 inclusive; acreage and yields and farm values of crops; noxious weeds; crop experiments; tests of silage crops; lysimeter work; soil fertility; alfalfa varieties; sheep feeding experiments; and orchard culture experiments.—*L. R. Hesler.*

15. DUNN, H. HAMMOND. *Dunn's on seed wheats*. Salisbury, England. [No date (1920?).]—There are included, among other matter, brief articles with the following captions: A short history of wheat cultivation in Britain; men who have helped towards a great wheat production; botanical notes on wheat; what a grain of wheat contains; manures for wheat; diseases and pests of wheat; varieties of seed wheat; yields of wheat.—*C. Stuart Gager*.

16. DEERR, NOËL. *The origin of the Uba and Cavengerie canes*. Internat. Sugar Jour. 22: 680-681. 1920.—Through correspondence with DANIEL DE PASS lately of the Réunion Estate in Natal with regard to the origin of the Uba cane, it appears that the firm of de Pass imported cane from both India and Mauritius to Natal. A cane believed by Mr. de Pass, Sen., to have come from India was planted by him. The label had been damaged, only the letters "Uba" were plain and at the time it was thought the letters represented but a part of the name. As the firm of de Pass obtained cane from India and Mauritius at nearly the same time, it is conceivable that the package thought to have come from India really came from Mauritius. The author then suggests a possible sequence of events covering the origin of the Uba cane, if it came from Mauritius. Cavengerie cane originated in New Caledonia and was taken to Mauritius. It was brought into Porto Rico in 1872; was taken to Brazil where it was called Louzier and under this name was sent to Argentina. It is also grown in Australia, where in some places it is misnamed Cheribon. A similar name, Kavangire, has been applied to the Uba cane, but where and how the name Kavangire was transferred to the Uba cane is not known.—*C. Rumbold*.

17. FABER, HARALD. *The growing of forage crops on the dairy farms of Denmark*. Scottish Jour. Agric. 3: 16-26. 1920.—The expansion of the forage crops of Denmark was occasioned by the quantities of cheap grain which came to Europe in the latter part of the nineteenth century. The acreage in roots increased from 6000 in 1861 to 678,000 in 1919. At present 1,900,000 acres are in grass and clover under rotation while 1,100,000 acres are in permanent grass. All the forage roots and most of the grasses are grown from high-yielding strains of Danish seed.—*H. V. Harlan*.

18. FINDLAY, WILLIAM M. *Potato synonyms*. Scottish Jour. Agric. 3: 202-207. 1920.—The varieties of potatoes reported were grown at the experimental farm of the North of Scotland College of Agriculture, at Craibstone. The synonyms are not necessarily ones of identical strain but of almost identical type. Fifteen varieties of the Duke of York, 32 of British Queen, 28 of Abundance, and 72 of "Up to date" are reported. The yields recorded show that in most instances the synonymous variety differed more from the type variety in the 1st and 2nd crops after it was acquired than was the case later.—*H. V. Harlan*.

19. GEMMILL, J. F. *Wheat-bulb disease*. Nature 106: 148. 1920.—The paper refers to infection by larvae of a fly (*Hylemyia coarctata*) which caused much damage in the east of Scotland during the past season. The eggs are laid among root crops, especially potatoes, and on fallow ground, so that the recommendations of recent German investigators that wheat should be preceded by root crops is based on error.—*O. A. Stevens*.

20. GESSNER, E. R. *Sugar cane farming for the beginner*. [Reprint of Winklespruit Government Experiment Station Bulletin issued in 1919.] South African Sugar Jour. 4: 1137-1195. 1920.—A practical account of sugar cane farming in South Africa is given with a discussion of climate, soil, field operations, varieties, and harvesting. The cane belt in South Africa is a narrow strip of country from Port-Shepstone on the south to just beyond Samkele on the north. The climate of Zululand is more suited to cane growing than is that of Natal, owing to its greater humidity and heat. The two most valuable types of soil in the cane area are Red Hillside and Black Vlei. The former is more readily brought into good condition for planting—the latter requires more experience in handling. There is a 3rd soil type found along the river bank and flats, liable to flooding by heavy rains, but of excellent productivity when the weather conditions are favorable. From experiments at the Winklespruit

station it was found that cane 12 months old is best for planting. Middle and tip portions of cane give better growth than butts for both the Uba, the standard variety, and the Agual, a recent introduction from India. Uba has long proved best adapted to local conditions. In Natal and Zululand fertile seed has never been produced by this variety, which makes crossing with Uba cane impossible in this section. Soft canes are seldom grown in this country. Several varieties have been tested at the experiment station and work is being continued with the more promising ones.—*E. Koch Tisdale*.

21. HANSEN, ALBERT A. **Chicory, control and eradication.** U. S. Dept. Agric. Dept. Circ. 108. 2-4. *Fig. 1.* 1920.—Chicory, a troublesome weed in pastures, meadows, and along roadsides in the northern half of the United States, is described. Its distribution and uses are given. Eradication and control measures are discussed.—*L. R. Hesler*.

22. HANSEN, ALBERT A. **The hawkweeds or paintbrushes.** U. S. Dept. Agric. Dept. Circ. 130. 3-7. *Fig. 1-2.* 1920.—Three noxious hawkweeds are described, namely, orange hawkweed (*Hieracium aurantiacum*), king-devil (*H. florentinum*), and yellow field hawkweed (*H. pratense*). Eradication and precautionary measures are given.—*L. R. Hesler*.

23. HAYWOOD, A. H. **Saccaline at Wollongbar experiment farm.** Agric. Gaz. New South Wales 29: 886-887. 1 *fig.* 1918.—Saccaline, recently introduced from Victoria, is a local name for a strain of sweet sorghum (*Andropogon sorghum*), which seems to have developed perennial habits. It attains a height of 12 feet, stools well, matures seed freely, has the ratooning habit and is considered more valuable than other sorghums. One grower is said to have obtained 9 cuttings. Chemical analysis is given.—*L. R. Waldron*.

24. HEADLEY, F. B. **The work of the Newlands Reclamation Experiment Farm in 1919.** U. S. Dept. Agric. Dept. Circ. 136. 3-21. *Fig. 1-3.* 1920.—The report gives yields and market value of alfalfa, barley, oats, wheat, potatoes, hay, pasture, garden and miscellaneous crops; variety tests of wheat, barley, and potatoes; tests of horticultural crops, including tomatoes and sweet corn; blossoming date for varieties of apples, pears, plums, and prunes; and concludes with an account of experiments made in the reclamation of alkali soil.—*L. R. Hesler*.

25. IVERSEN, K. **Lokale Markforsøg i Danmark.** [Local field experiments in Denmark.] Nordisk Jordbrugsforskning (København) 1920: 102-120. 1920.—The author summarizes and discusses experiments carried on with fertilizers, high yielding strains, seed disinfection and potato sprayings by a large number of local experimenters and by farmers' unions during the years 1893-1919. The increased crop yields are compared with the amount of artificial fertilizers applied and with the varying costs of the fertilizers and treatments.—*Ernst Gram*.

26. JOHNSON, E. **Behavior of inoculated leguminous seed.** Monthly Bull. Dept. Agric. California 9: 31-36. 1920.—Nitrogen-fixing bacteria exist in several forms, i.e., bacteria from certain legumes will not inoculate certain other legumes. Legumes are divided into 14 groups. The organisms from the nodules of any legume can inoculate any other legume within the same group only. In the field, the organisms can withstand any degree of acidity or alkalinity that the corresponding legume can endure. Inoculation does not render the plant immune to any of the diseases to which it is susceptible, does not increase its resistance to frost, sunburn, alkali, acidity, drought or excess moisture, and does not in any way alter its habit of growth.—*E. L. Overholser*.

27. KELBERGER, L. RITTER, UND F. SCHONHEIT. **Welche Leistungen können wir vom Anbauheimischer Sommerölrüchte erwarten.** [What result may we expect from the culture of domestic summer oil plants.] Mitteil. Deutsch. Landw. Ges. 35: 705-713. 1920.—A general paper on the culture of oil producing plants, such as mustard and rape, together with tables giving the results of tests.—*A. L. Pieters*.

28. KERLE, W. D. Farmers' experiment plots. Maize experiments, 1919-20. Upper north coast district. Agric. Gaz. New South Wales 31: 875-881. 1920.—Experiments were conducted on various private farms in the district. In variety trials of maize a maximum yield of 85 bushels per acre was secured from Improved Yellow Dent. The maximum net gain secured by using mineral manures amounted to 25 bushels, or \$43.25 per acre. With but one exception, the use of mineral manures showed net gains over land receiving no manure at all.—*L. R. Waldron.*

29. KUO, TAN HSIEN. A plan for cotton improvement at the Chinese Cotton Mill Owners Association. Hua-Shang-Sha-Chang-Lien-Ho-Hui-Ki-Kau [China Cotton Jour.] 1³: 4-8. 1920.—A plan is outlined for the establishment of cotton breeding experiment stations, the organization of scientific departments and staffs, and the nature of the contemplated work, with the object of increasing the yield and quality of cotton in China. A five-year program for proposed projects in cotton breeding is also given.—*Chunjen C. Chen.*

30. KOO, TAN HSIEN. [Translation of: TODD, JOHN A. The world's cotton crops. A. and C. Black: London, 1914.] Hua-Shang-Sha-Chang-Lien-Ho-Hui-Ki-Kau [China Cotton Jour.] 1⁴: 206-228. 1920.

31. LAUDER. The electrical treatment of seeds. Scottish Jour. Agric. 3: 340-344. 1920.—Reports of farmers and some early field tests support the claims of the originators of the WOLFRYN process as to greater returns from treated seed. Subsequent tests more carefully made show no such advantage. Treating oats was found unprofitable by A. F. WILSON in West Lothian and by JOHN WALKER in Berwickshire and Roxburghshire. MARTIN H. F. SUTTON at Reading compared yields and germinations in seeds of carrots, swedes, cabbages, and mangolds. In each case treated seed was compared with untreated, and with seeds immersed in solutions of salt and sulphate of ammonia. All yield differences were within the limits of experimental error.—*H. V. Harlan.*

32. LEMMERMAN, O. Ueber die Kohlensäureernährung der Pflanzen. [On the carbonic acid nutrition of plants.] Mitteil. Deutsch. Landw. Ges. 35: 696-699. 1920.—The author refers to BORNEMANN's theory (see Bot. Absts. 8, Entry 12) that stable and green manures evolve CO₂ and that this stimulates growth; and shows that his experiments give no support to the Bornemann theory. He found that the air over pots of soil liberally supplied with organic material contained very small amounts of CO₂ but that the air drawn through such pots contained quantities of CO₂ approaching the theoretical maxima from the organic material applied. Pot and field experiments were conducted in various ways but in no case was there a larger crop that could be attributed to an increase in the CO₂ content of the air.—*A. J. Pieters.*

33. LOMANITZ, S. The oil of the prickly pear seed. Jour. Indust. Eng. Chem. 12: 1174-1175. 1920.—The oil apparently falls into the group of semi-drying oils, and if produced in sufficient quantities might be used in some of the oil-products industries.—*Henry Schmitz.*

34. McCaULEY, C., AND L. G. LITTLE. Ploughing experiments at Cowra and Nyngan. Agric. Gaz. New South Wales 31: 837-840. 1920.—Wheat was grown on land plowed shallow, medium, and deep, by disc and mold board plows, and also upon sub-soiled land. In no case was the more expensive treatment decisively favorable and at Nyngan, particularly, the cheaper methods gave best results.—*L. R. Waldron.*

35. McDONALD, A. H. E. The saving of seed wheat. Agric. Gaz. New South Wales 31: 841-842. 1920.—Suggestions are offered in regard to distribution of proper wheat varieties, following drouth conditions.—*L. R. Waldron.*

36. MAIDEN, J. H. Chats about the prickly pear. No. 7. Agric. Gaz. New South Wales 31: 889-893. 1920.—Use and value of different exterminators of prickly pear (*Opuntia* spp.) are discussed, including arsenite of soda and arsenious chloride. Literature is cited.—*L. R. Waldron.*

37. MAKIN, R. N. Some recently introduced fodder plants. *Agric. Gaz. New South Wales* 31: 873-874. 1920.—Brief cultural notes are given on Sudan grass, elephant grass (*Pennisetum purpureum*), and saccaline (*Andropogon sorghum*).—L. R. Waldron.

38. MATERNAERS, F. F. Der Grubensilo und der Schanzensilo. [The pit silo and the tank silo.] *Mittel. Deutsch. Landw. Ges.* 35: 673-679. 1920.—Detailed descriptions, with diagrams, of methods of constructing the pit and the tank silo.—A. J. Pieters.

39. NEWHALL, C. A. The direct identification of soy-bean oil. *Jour. Indust. Eng. Chem.* 12: 1174-1175. 1920.—A method of identification of soy-bean oil involving the use of uranium acetate or uranium nitrate is discussed.—Henry Schmitz.

40. OEBERSTEIN. Ueber einige seltenere Luzerne und Wollklettenbeischlüsse. [Concerning some rare lucerne and woolcombings enclosures.] *Landw. Jahrb.* 53: 627-637. 1919.—The author describes some impurities and adulterants found in lucerne seed which appear to indicate the source as Persia and Asia Minor. The seeds secured from woolcombings proved to be those of *Medicago denticulata* and *M. maculata*.—A. J. Pieters.

41. PARDY, ALEXANDER. Broadcasting versus drilling oats. *Scottish Jour. Agric.* 3: 232-236. 1920.—In a 4-year test in northern Scotland the high yields of grain were obtained by 4 different methods of seeding, in the following order: cross drilled, broadcast and drilled, broadcast, and single drilled. The total average difference was less than 3 bushels. In seeding, 6 bushels were used on the drilled plots, 7 on the plot drilled and broadcast, and 8 on the broadcast plot.—H. V. Harlan.

42. PIUTTI, A. Sur l'action de la chloropicrine sur les parasites du ble et sur les rats. [The effect of chloropicrine on the parasites of wheat and on rats.] *Compt. Rend. Acad. Sci. Paris* 170: 854-856. 1920.—Results are given of experiments in the use of chloropicrine as an insecticide for wheat. The seed was treated with a dose of 10 cc. per cubic meter. The loss in percentage of germination was found to be 30. Flour and bread made from seed treated in this way showed no deleterious effect.—C. H. Farr.

43. RØRDAM, K. Undersøgelse af olieholdige Frø af en ukendt Plante. [An unknown plant with oil-containing seed.] *K. Veterinaer og Landbohøjskole Aarsskr.* 1920: 36-42. 1920.—An undetermined rape hybrid, seed of which was found as a contamination in Russian flax seed, upon analysis proved to have about the same chemical composition as rape seed, and is being taken up for comparative experiments at the state experiment stations.—Ernst Gram.

44. SHEAR, W. V. How certified seed potatoes will benefit the California potato industry. *Monthly Bull. Dept. Agric. California* 9: 375-381. 1920.

45. SYMON, J. A. The turnip crop of Scotland. *Scottish Jour. Agric.* 3: 26-35. 1920.—In 1919 turnips were grown on 426,251 acres of the 3,408,479 acres of arable land in Scotland. For sanitary reasons turnips are grown in 5, 6, or 7-year rotations. The largest seeds produced the largest plants. The seed is drilled in ridges 28 inches apart. Seeding should be completed before May 25. Phosphorus is the most important fertilizer for the turnip crop.—H. V. Harlan.

46. THOMPSON, H. C. The manufacture and use of peanut butter. *U. S. Dept. Agric. Dept. Circ.* 128. 3-16. *Fig. 1-6.* 1920.

47. TUNG, SHIH CHIN. [Kaoliang and breeding.] (Text in Chinese.) *Khu-Shou* [Science-Publ. Chinese Sci. Soc.] 5: 712-716. 1920.—A general discussion is presented of *Andropogon sorghum* varieties *obovata*, *saccharatus* and *vulgare* regarding root systems, drought resistance, relations to soil, self-fertilization and cross-fertilization, poisonous content, and adaptability to all kinds of soil. Methods of producing pure seeds from desirable plants and methods of cross-pollination are described. The head-to-row system of individual

selection is also outlined. The important factors to be considered in making selections in kaoliang breeding are: Sugar content, earliness, disease resistance, drought resistance, productivity, erectness, and shape.—*Chunjen C. Chen.*

48. VENDELMANN, HENRY. *Reclamation of waste land.* Scottish Jour. Agric. 3: 319-328. 1920.—Waste land is reclaimed in South England and Belgium for agriculture, forestry, and fisheries. Winter wheat, spring oats, turnips, rape, buckwheat, and potatoes are favorite first crops. Pine, larch, spruce, and poplar are more commonly used in tree plantings. Where fish are grown in shallow ponds, which are drained and cultivated every third year, an unusual rotation of fish and oats occurs.—*H. V. Harlan.*

49. WALSTER, H. L. *Earliness and rustiness of spring wheats.* North Dakota Agric. Exp. Sta. Bull. 143. 8 p., 1 fig. 1920.—Yields of varieties Red Bobs, Prelude, Ruby, Kitchener, Pioneer, and Marquis are given and also amounts of stem rust (*Puccinia graminis*) occurring on each in different years. Marquis has given best yields.—*L. R. Waldron.*

50. WATSON, ROBERT. *Agriculture in Orkney.* Scottish Jour. Agric. 3: 306-315. 1920.—Early maturing and non-shattering varieties of oats and barley are grown, also grasses and white and red clovers. The Sandy variety of oats and 6-rowed barley, which are early maturing and non-shattering, are grown. The "Up-to-date," Abundance, and British Queen varieties of potatoes are cultivated.—*H. V. Harlan.*

51. WENHOLZ, H. *Pigeon pea (Cajanus indicus).* Agric. Gaz. New South Wales 31: 888. 1920.—Cultural notes are given.—*L. R. Waldron.*

52. WILLIAMS, CHARLES BURGESS, AND DANIEL HARVEY HILL. *Corn book for young folk.* 250 p., 186 fig. Ginn and Company: Boston, 1920.—This book, which is designed to interest and enlighten the very young agriculturists of the country, relates the story of corn and its culture in a simple, readable style. At the conclusion of each chapter the important facts contained therein are brought out by questions.—*C. V. Piper.*

53. YEH, YUEN TING. [Standard varieties of American cotton and selection.] Hua-Shang-Sha-Chang-Lien-Ho-Hui-Ki-Kau [China Cotton Jour.] 14: 235-245. 1920.—Methods are discussed and described of maintaining the purity of cotton varieties developed by the U. S. Department of Agriculture through selection. Outlines of 5-year system in mass selection and 7-year system in progeny selection for use in China are given. A descriptive table is given of the characteristics of Acala, Columbia, Durango, King, Lone Star, and Trice.—*Chunjen C. Chen.*

54. YEH, YUEN TING. [A study of cotton production in China.] Hua-Shang-Sha-Chang-Lien-Ho-Hui-Ki-Kau [China Cotton Jour.] 12: 233-241; 13: 221-236. 1920.—The author reports a two months' investigation of the Chinese cotton-growing situation made in the summer of 1919 with Mr. O. F. Cook, U. S. Department of Agriculture. Nine provinces were surveyed: Kiangsu, Chekiang, Anhwei, Shantung, Chihli, Honan, Hunan, Hupeh, and Kiangsi. The climate of the northern part of the region is dry, while the southern part is wet. The soils vary from heavy clays to sandy loams. Mass planting is the common practise, though row-planting is used to some extent. American varieties are quite common throughout the region. Chinese cotton is of two kinds, brown and white. American cotton consists mostly of the following varieties distributed by the U. S. Department of Agriculture: Lone Star, Trice, King, Acala, Durango, Columbia, Egyptian, and Sea Island. A species of Chinese Upland cotton was observed but no record of its origin was found. The provinces of Chihli, Honan, Shansi, Shensi, and Shantung are said to be suited to growing American cotton. The following cotton insects were observed: Bollworm, pinkworm, leaf-hopper, red spider, cutworm, and cotton caterpillar. Diseases noted were anthracnose, rust, shedding of bolls, angular leaf spot, and damping-off. Five governmental cotton stations and 9 private stations visited by the author are listed. Suggestions for improving Chinese cotton are given: (1) Careful selection and variety test; (2) close planting and late chopping; (3) deep plowing and frequent cultivating; (4) better drainage in the southern region; and (5) Trice is considered to be adaptable in China.—*Chunjen C. Chen.*

BIBLIOGRAPHY, BIOGRAPHY AND HISTORY

NEIL E. STEVENS, *Editor*

(See also in this issue Entries 15, 17, 162, 163, 165, 192, 324, 377, 687, 692, 737, 744)

55. ANONYMOUS. International catalogue of scientific literature. *Nature* 106: 195-196. 1920.—Review of the history of the catalogue and of a conference to consider its continuation.—O. A. Stevens.

56. ANONYMOUS. Some new botanical memoirs. *Sci. Prog.* [London] 14: 644-645. 1920.—The appearance of a new botanical publication entitled "Botanical Memoirs" initiated and edited by A. H. Church, Botany School, Oxford, is noted.—J. L. Weimer.

57. ANONYMOUS. Texas Pecan Growers Association organized. *Amer. Nut Jour.* 12: 86-87. 1920.

58. ANONYMOUS. [Rev. of: GEDDES. The life and work of Jagadis C. Bose.] *Jour. Botany* 58: 299. 1920.

59. BASTIAN, W. The origin of life: The work of the late Dr. Charlton Bastian, F.R.S. *Sci. Prog.* [London] 14: 461-462. 1920.—Dr. Bastian believed that living matter is constantly coming into being in suitable environment, a process which he termed "archebiosis." He claimed to have brought about the *de novo* origin of definite well-known living organisms from certain colloidal saline solutions enclosed within hermetically sealed and sterilized glass tubes.—J. L. Weimer.

60. BRAGG, LAURA M. Contributions toward a history of science in South Carolina. I.—Henry W. Ravenel, LL.D.—*Charleston Mus. Bull.* 16: 17-23. 1920.—Twelve specimens of Ravenel's fungi recently added to the museum herbarium are listed, and several interesting letters to Professor Lewis R. Gibbes of Charleston are reproduced.—Neil E. Stevens.

61. BRITTEN, JAMES. Bibliographical notes, LXXIXa, Lehmann's Pugillus, I. *Jour. Botany* 58: 292-293. 1920.—Corrections are here made of a previous paper on the same subject (*Jour. Botany* 58: 108).—The inspection of an original issue of No. 1 at Kew showed the author to be in error in ascribing the original description of 8 species of cacti to Nov. Acta instead of to the Pugilli. Other slight errors are pointed out.—K. M. Wiegand.

62. BRITTEN, JAMES. John Reader Jackson. *Jour. Botany* 58: 298. 1920.—A biographical sketch of J. R. Jackson (1837-1920) for 43 years Curator of the Kew Museums.—K. M. Wiegand.

63. BRITTON, N. L. Report by the Director-in-Chief upon a visit to botanical institutions in England. *Jour. New York Bot. Gard.* 21: 197-208. 1920.—Information is presented on the plant collections, botanical research, and personnel at Kew and elsewhere.—H. A. Gleason.

64. CONDIT, I. J. Bits of fig history in California. *Monthly Bull. Dept. Agric. California* 8: 260-265. 1919.

65. DEWITZ, J. Die Immunsande. Zusammenstellung der Literatur über die für die Reblaus immunen Sande. [Immune soils. A bringing together of the literature concerning the soils immune to Phylloxera.] *Landw. Jahrb.* 35: 435-484. 1919.—The author calls attention to the fact that it has long been known that Phylloxera can not live in certain soils. The literature is, however, old and inaccessible, so the author has brought this together in the above paper.—A. J. Pieters.

66. DORPH-PETERSEN, K. Frederik Kølpin Ravn. *Nat. Verden* [København] 4: 289-301. *Portrait.* 1920.—A scientific and personal appreciation.—Ernst Gram.

67. FAWCETT, W. William Harris. Jour. Botany 58: 298-299. 1920.—A short biographical sketch of William Harris (1860-1920), best known for "botanical exploration in Jamaica.—K. M. Wiegand.

68. FERDINANDSEN, C. F. Kølpin Ravn. Nordisk Jordbrugsforskning [København] 1920: 137-142. *Portrait*. 1920.—An account of the life and work of Professor Ravn (1873-1920) by his successor.—*Ernst Gram*.

69. RAVN, F. KØLPIN. Experiments in plant culture in Denmark. Scottish Jour. Agric. 3: 207-214. 1920.—There are 8 state experimental stations dealing with agricultural problems and 3 with horticultural problems. Plant improvement has made remarkable progress especially in root crops and forage plants. New strains originated by institutions and individuals are tested in open competition by the state experiment station and the results determine the market demand for the seed.—*H. V. Harlan*.

70. RAVN, F. KØLPIN. Praktisk Erfaring og videnskabelig Forskning i Plantepatologiens Historie. [Practical experience and scientific research in history of phytopathology.] Nat. Verden [København] 4: 302-316. 1920.—A demonstration of coöperation in the development of seed disinfection, protectional spraying, frost control, and report service.—*Ernst Gram*.

71. ROSIN, JOSEPH. Arthur Meyer. Jour. Amer. Pharm. Assoc. 9: 851. *Portrait*. 1920.—A brief sketch of the life and botanical activities of Arthur Meyer.—*Anton Hogstad, Jr.*

72. SALISBURY, E. J. [Rev. of: BOWER, F. O. Joseph Dalton Hooker. 62 p. Society for Promoting Christian Knowledge: London, 1919.] Sci. Prog. [London] 14: 692. 1920.

73. STEVENS, F. L. Changes of a decade in plant pathology. [Abstract.] Phytopath. 10: 65. 1920.

74. TROOST, D. Overzicht van de in ons land verbouwde tarwerassen. [Review of cultivated wheat races in our country.] Cultura 32: 226-244. 1920.—The occurrence of wheat varieties in the Netherlands is chronologically divided into the periods 1806-40, 1840-65, 1865-1900, and after 1900. Polish wheat (*Triticum polonicum*) was well known at the beginning of the nineteenth century. In 1826 in the province of Sealand, Russian was grown for the first time, and in 1834 came Giant, also known as Syrian wheat (*T. turgidum*). In 1835 the price of wheat declined in Friesland and Groningen, consequently wheat raising diminished, but with higher prices in 1839 more wheat was grown. Red wheat then became more common, and Zeeuwsche (Sealand) wheat came into favor. In 1840 the Whittington was introduced, originally found in Switzerland by Whittington. Chiddam was grown from about 1850, and Zeeuwsche wheat was more largely cultivated. From 1865 to 1900 many English varieties were introduced, such as Squarehead, Prolific, Rough Chaff, Essex, Victoria, and others, most being of excellent quality though some were not sufficiently resistant to frost. A variety of Polish wheat has been raised since 1870, and the Dikkop (thick-head), discovered in a field with English wheat in 1865, is still to be found. In 1886 reciprocal crosses were made by BROEKEMA between Zeeuwsche and Squarehead, from which originated Duivendal and Spijk, both of good quality. MANSOLT obtained the Fletumer wheat, which because of its hardness was of much value in the northern province of Groningen. In 1889 Broekema again crossed Squarehead with Zeeuwsche, obtaining an excellent strain, which in 1901 was called Wilhelmina, at present the leading variety. Other good varieties of late years are Millioen and Imperial, from which was derived the improved strain Imperial II a.—*J. C. Th. Uphof*.

75. WARNER, MARJORIE F. Bibliographical Notes, LXXXII. The dates of Rheede's "Hortus Malabaricus." Jour. Botany 58: 291-292. 1920.—The date of part 4 is shown to be 1683 instead of 1673. The diversity in title pages of the various volumes of this work, and even between corresponding volumes of different sets is noted, and readers are requested to make public information which supports any date earlier than 1673 for the first volume.—*K. M. Wiegand*.

76. WHETZEL, H. H. Institute for plant protection. Sci. Amer. Monthly 2: 174-175. 1920.

BOTANICAL EDUCATION

C. STUART GAGER, *Editor*ALFRED GUNDERSEN, *Assistant Editor*

(See also in this issue Entries 8, 167, 286, 606)

77. ANONYMOUS. [Rev. of: CRABTREE, J. H. *Grasses and how to identify them.* 64 p. The Epworth Press: London (no date).] *Nature* 105: 805. 1920.

78. ANONYMOUS. [Rev. of: ELLIS, G. S. M. *Applied botany.* viii + 248 p., 67 illus., 2 maps. Hodder & Stoughton: London, 1919.] *Sci. Prog.* [London] 14: 692-693. 1920.

79. ANONYMOUS. [Rev. of: MARTIN, J. N. *Botany for agricultural students.* x + 585 p. John Wiley & Sons: New York; Chapman & Hall: London; 1919.] *Sci. Prog.* [London] 14: 512-513. 1920.

80. ANONYMOUS. [Rev. of: PETERS, C. A. *The preparation of substances important in agriculture: A laboratory manual of synthetic agricultural chemistry.* 3rd ed., vi + 81 p. Chapman & Hall: London; John Wiley & Sons: New York; 1919.] *Sci. Prog.* [London] 14: 513. 1920.

81. ANONYMOUS. [Rev. of: WILLIS, J. C. *A dictionary of the flowering plants and ferns.* 4th ed., lviii + 712 p., 41 fig. Cambridge University Press: 1919.] *Sci. Prog.* [London] 14: 508-509. 1920.

82. BERRY, JAMES B. *Vocational forestry education.* *Jour. Forestry* 18: 730-731. 1920.

83. DAVIS, BRADLEY M. *Introductory courses in botany.* V. *School Sci. and Math.* 20: 692-696. 1920.

84. HARRIS, G. W. *Experimental farming.* *Sci. Prog.* [London] 14: 458-461. 1920.—The writer feels that before the agricultural scientist can be of the greatest assistance to the farmer he must become more familiar with the practical problems of farm life.—J. L. Weimer.

85. KÜSTER, ERNST. *Lehrbuch der Botanik für Mediziner.* [Text-book of botany for medical students.] 480 p., 28 fig. (some colored). F. C. W. Vogel: Leipzig, 1920. [Price of volume, unbound, 85 M.; bound, 100 M.]—The first 57 pages are devoted to the gross morphology of cryptogams and phanerogams, with emphasis on the latter. Anatomy is treated in the following 44 pages, about equal space being given to cell study (cytology) and tissue study (histology). Physiology occupies 75 pages, reproductive processes in phanerogams and cryptogams as well as variability, inheritance, mutation, etc., being included in this chapter. Thirty pages are devoted to "plant chemistry," the latter treated under 15 heads according to the nature of the compounds treated. Pathology occupies 35 pages, about half devoted to physiological disturbances not due to parasites (discussed under 9 heads) and half to plant diseases due to parasites, about equal space being given to plant and animal parasites.—The second part of the book (150 pages) is entitled special, or systematic, botany. The entire plant kingdom is treated, the enumerated forms, however, being almost exclusively those of practical importance as sources of food, drugs, poisons, raw products of use in industry, and the like.—All parts of the book are profusely illustrated. An extensive 20-page subject index is included.—J. R. Schramm.

86. LANE-POOLE, C. E. *Professional forestry education.* *Australian Forest. Jour.* 3: 217-223. 1920.—A paper read at the Hobart Forestry Conference. The author advances argument for the establishment of a federal forestry school organized along the lines of the French school at Nancy, considered the best of its kind in Europe. The curriculum, faculty, terms, fees, and certain other details of organization are discussed. New South Wales, on

account of the great diversity of its forest conditions, is suggested as the most desirable state in Australia for the school.—*C. F. Korstian*.

87. SUN, EN LIN. [A summer course in cotton-growing at the Nanking Teachers' College.] Hua-Shang-Sha-Chang-Lien-Ho-Hui-Ki-Kau [China Cotton Jour.] 21: 218-223. 1920.—The program is outlined of a 6-week course designed to give the student a fundamental knowledge of cultural methods and breeding technique of the cotton crop. A list of the members of the instructing staff and a curriculum are also given.—*Chunjen C. Chen*.

CYTOLOGY

GILBERT M. SMITH, *Editor*

GEORGE S. BRYAN, *Assistant Editor*

(See in this issue Entries 221, 254, 273, 292, 328, 330, 333, 342, 442, 605)

ECOLOGY AND PLANT GEOGRAPHY

H. C. COWLES, *Editor*

G. D. FULLER, *Assistant Editor*

(See also in this issue Entries 1, 168, 182, 395, 432, 437, 442, 453, 585, 683, 684, 686, 687, 689, 692, 695, 696, 701, 702, 703, 708, 719, 720, 727, 728, 730, 732, 735, 739, 744)

GENERAL, FACTORS, MEASUREMENTS

88. BRADSHAW, R. V. Color variations in flowers. *Amer. Bot.* 26: 23, 24. 1920.—Additions to the list of flowers with varying color published in *American Botanist* for Aug. 1919.—*W. N. Clute*.

89. HAUGH, L. A. Klimaets Indflydelse Paa Udviklingen af Bogens Sommerskud. [Influence of climate on the development of summer growth of beech.] *Dansk. Skovforenings Tidsskr.* 4: 13-28. Fig. 4. 1919.

90. LE PLASTRIER, G. M. Notes on loranths from Wagga district. *Australian Nat.* 4: 139. 1920.—It is observed that the mistletoes of the region grow on hosts having leaves of a form similar to those of the parasite; thus they are hard to detect.—*T. C. Frye*.

91. PORSILD, A. E. Sur le poids et les dimensions des graines arctiques. [On the weight and dimensions of arctic seeds.] *Rev. Gén. Bot.* [Paris] 32: 97-120. 1920.—Contrary to the thesis of SCHUEBELER, author finds after many determinations and comparisons that seeds of plants grown in arctic regions (Greenland) are relatively lighter than those of the same or related species grown in alpine or temperate regions.—*L. W. Sharp*.

92. WHERRY, EDGAR T. Soil tests of Ericaceae and other reaction-sensitive families in northern Vermont and New Hampshire. *Rhodora* 22: 33-49. 1920.—A record of field experiments carried out by the author to determine the acidity and the alkalinity of soils in which several species of the Ericaceae and some other plants were growing. The determinations were made by indicators in the field according to a method recently described by the author (*Jour. Wash. Acad. Sci.* 10: April, 1920). The studies were made during June, 1919, in a variety of mountain, bog, and swamp areas in New Hampshire and Vermont, each of which is described. The general and local soil conditions in each are given, together with lists of plants found. All of the Ericaceae, with one exception (*Pyrola asarifolia* Michx.), were found in soils giving an acid reaction; although the members of the subfamily Pyroloideae, when compared with members of the other subfamilies, grew more abundantly in soils of rather low specific acidity. The exceptional species, *P. asarifolia*, was found only in neu-

tral soils. Among the Orchidaceae, the northern species seemed to attain their greatest development in circumneutral soils, i.e., neutral or only weakly acid or alkaline soils, while most of the southern species apparently preferred more acid soils.—The paper concludes with a list of plants studied, other than those of the above two families, which proved to be oxyphytes, and a list of those which were found to be calcicoles.—*James P. Poole*.

93. WHERRY, EDGAR T. The soil reactions of certain rock ferns—I. Amer. Fern Jour. 10: 15-22. 1920.—The author gives a table, "Classification of Rock Ferns on the Basis of Soil Reaction," listing 7 acid soil plants and 18 calcareous soil plants. He then discusses 7 individual species representing 4 genera.—*F. C. Anderson*.

STRUCTURE, BEHAVIOR

94. JAKUES, H. E. Some phenological records of spring flowering plants of Henry County. Proc. Iowa Acad. Sci. 25: 413-415. Fig. 162. 1920.—Dates of first flowering of twenty species appearing in March, April, and May, 1915-1918, at Mt. Pleasant, Iowa, are shown in a table. Six species are shown on a graph. In 1916 *Acer saccharinum*, *Phlox divaricata*, and *Berberis vulgaris* bloomed later than in any other year. But *Sanguinaria canadensis* and *Acer negundo* bloomed latest in 1917.—*H. S. Conard*.

95. SCHMIDT, WILHELM. Die Verbreitung von Früchten durch die Luftbewegung. [The distribution of seeds by air currents.] Naturwissenschaften 7: 810-812. 1919.—Formulae are developed whereby the distances to which winged seeds and pollen may be carried by the wind can be determined.—*Orton L. Clark*.

96. STEVENS, O. A. Notes on species of *Halictus* visiting evening flowers (Hyn.). Entomol. News 31: 35-44. 1920.—Some observations on four species of bees visiting evening flowers, particularly primroses, are recorded. One species is new; this one and two others are especially adapted to collecting pollen from the Onagraceae, due to a sparseness of the scopa which makes possible the adhesion of the pollen mass. Observations on the opening of the flowers and the visits of the bees are recorded for *Megaptermum missouriense*, *Allionia hirsuta*, *Onagra strigosa*, *Anogra pallida*, and *Gaura coccinea*. These bees fly about the flower buds before any sign of opening is visible; at the first small opening they force their way in, one or two visits stripping the flower of its pollen mass. A group of *Onagra* plants observed at intervals showed that most of the flowers open at 9:00 p.m., although some were found to open later in the evening.—*Wanda Weniger*.

97. WEAVER, J. E. The ecological relations of roots. Carnegie Inst. Washington Publ. 286. 128 p., 30 pl., 53 fig. 1919.—The root habits of about 140 species of dominant and subdominant shrubby and herbaceous plants occurring under a wide range of environmental conditions and studied in the field are described and in part figured by habit photographs and root maps. The communities represented in the research include the chaparral of southeastern Nebraska, the prairies of eastern Nebraska and of southeastern Washington, "the plains association and sandhill subclimax of Colorado, and the gravel-slide, half-gravel-slide, and forest communities of the Rocky Mountains of Colorado." With the description of the root systems of each community is given an account of the temperature, precipitation, evaporation, wind movements, and notes on the soil conditions, including the moisture content.—In the prairies of eastern Nebraska more than half of the plants studied have roots which penetrate to a depth exceeding 5 feet, with a maximum penetration of 13-20 feet. The roots exhibit a condition of layering with accompanying reduction of competition of contiguous species for soil moisture. The soil is loess and glacial drift, and the water content of the upper 4-5 feet may be so reduced that none is available for plant growth. About 71 per cent of the rainfall occurs during the growing season. The mean summer temperatures are high and the mean humidity is often low. The wind averages about 70 miles per day.—The plants of the prairie community of southeastern Washington are not so deeply rooted as are those of the Nebraskan prairies. Out of a total precipitation of 21 inches annu-

ally only about one-third occurs during the season of growth. Sometimes the water content of the soil to a depth of 3 or 4 feet is reduced to the point where it is not available for plant growth. Roots penetrate more deeply in loess than in glacial drift soils. Aeration may also be a factor of importance in these differences in root penetration.—The chaparral community, between the Ohio-Missouri forest complex and the prairies to the westward, have plants with well developed absorbing systems. The roots penetrate to a depth of 5.5 to 21 feet, but all are deeply placed. Vegetative propagation is a feature in this community.—In the plains the plants are more deeply rooted than in the prairies although the extreme depth attained in certain instances was found to be less. The generalized type of root system is most common. The precipitation is about 15 inches, 80 per cent of which falls during the season of growth. Water does not penetrate to a depth greater than 13 feet, or that marking the deepest placing of the roots. The prominence of shallow, widely spreading laterals is a feature of certain species, as in the cacti and in *Yucca*. At certain periods during the summer no water is available in the soil for plants to a depth of 5 feet, and it is uniformly dry to a depth of 7 feet. The subaerial plains environment is characterized by active wind movements, great daily fluctuations in air temperature, and relatively high evaporation throughout the growing season.—In the sandhills the roots are various, although long, widely spreading roots in the upper soil stratum, within 2 feet of the surface, are possessed by nearly all of the species studied. Several plants which develop deep roots in the plains have only shallow roots in the sandhills. The subaerial environmental conditions are similar to those of the plains and differences in root development are attributable to edaphic causes. The upper 2-3 feet of soil carry more moisture than the deeper soil. The most extensive root system of any seen, that of *Ipomoea leptophylla*, was found in this community.—In the gravel-slide community the roots of all plants are shallowly placed, few lying below a depth 1.5-2 feet. This is related to the frequent summer showers of little penetration. The roots in the half-gravel-slide are shallowly placed, as in the gravel-slide, but also supplementary deep roots are developed. This is related to more favorable deep-soil conditions. Intense shallow-root competition occurs in the half-gravel-slide. Reliance on water of the deeper soils, a feature of this community, carries the plants over periods of drought.—In the forest a relatively shallow-rooted condition is to be found and this is true of many trees as well as of lesser plants. This characteristic is related to the distribution of moisture in the soil, which is most abundant in the surface layers. The roots also have relatively poor lateral development.—Where species occur in distinctly different habitats the root development generally conforms to the community root type, although exceptions were found in a few instances.—*W. A. Cannon.*

98. WEAVER, J. E. Ecological relations of roots. [Abstract.] Publ. Nebraska Acad. Sci. 10: 15-16. 1920.—See Bot. Absts. 8, Entry 97.

VEGETATION

99. ANDERSEN, EMMA N., AND ELDA R. WALKER. An ecological study of the algae of some sandhill lakes. Trans. Amer. Microsc. Soc. 39: 51-84. Pl. 3-12, fig. 1-17. 1920.—This study was made in Cherry county, western Nebraska, in the sandhill country abounding in bodies of water. The latter vary in size from mere ponds to lakes 3 or 4 square miles in area, and in depth from 2 to 15 feet. The lakes are surrounded by grassy meadows and sand dunes. The climate is dry, windy, hot in summer and cold in winter. By analysis the water of the different lakes varies in alkalinity from 111 to 1129 parts per million. Many migratory birds visit the lakes, probably bringing the spores of many algae on their feet.—The work was limited to a few localities representative of the different types of habitat of the region. Climatic conditions—daily variations of temperature of air and water at different depths—were obtained by use of standard instruments. For the study of light intensity at different depths a modification of the solio photometer was used.—The lakes were found of fairly uniform temperature, aeration, and alkalinity. Two factors influence the distribution of algae, light and mechanical support. Nine lakes were studied, and lists of algae found in early summer, midsummer, and in October are given. It is concluded that the occurrence of algae in a given body of water is due largely to seasonal periodicity, mineral and gas content of the water, and light intensity.—*S. H. Essary.*

100. HAYDEN, ADA. Notes on the floristic features of a prairie province in central Iowa. Proc. Iowa Acad. Sci. 25: 369-389. Fig. 145-161. 1920.—The area shows four formations: upland prairie, meadow, swamp, and pond, with several consocieties. Lists of plants of each consociety are given, with some notes on soils. Reversion takes place slowly and is rare. Evidence of invasion of the prairie by forest in ravines or on moist slopes is not uncommon. The figures are photographs of typical plant groups and habitats.—H. S. Conard.

101. KASHYAP, S. R. Note on the floating islands of Riwalisar. Jour. Indian Bot. 1: 252-253. 1920.—In Mundi State in the outer north-west Himalayas there is a small lake in which are 7 floating islands, formed almost exclusively of *Phragmites*, probably *P. communis*. A detailed study of the islands was not made.—Winfield Dudgeon.

102. LOWE, C. W. The flora of Warrens Landing, Lake Winnipeg, Manitoba. Canadian Field-Nat. 34: 26-30. 1920.—Warrens Landing possesses a typical muskeg covered with the coniferous trees *Picea alba*, *P. mariana*, and deciduous trees, especially poplars, willows, and birch. There is a dense shrubby undergrowth in which are many of the flowering plants typical of the North. A list of the plants found at Warrens Landing, arranged in taxonomic sequence, accompanies the ecological notes.—W. H. Emig.

103. MOORE, G. T., AND J. L. KARRER. A subterranean algal flora. Ann. Missouri Bot. Gard. 6: 281-307. 1919.—Results are reported on algal cultures prepared by inoculating sterile portions of a modified Beyerinck solution on sand with soil taken from various depths down to 1 m. Various types of soils used were from Missouri, Massachusetts, and California. It was found that "there exists a subterranean algal flora independent of the nature of the soil and locality." *Protoderma viride*, it would seem, is "especially adapted to live under subterranean conditions;" however, 13 other algae were found at a depth of at least 20 cm. "The greatest growth was never at the surface but at a depth of 5-60 cm." A detailed physiological study of *Protoderma viride* is forthcoming.—S. M. Zeller.

104. NICHOLS, GEORGE E. The vegetation of Connecticut. VI. The plant associations of eroding areas along the seacoast. Bull. Torrey Bot. Club 47: 89-117. Fig. 1-6. 1920.—The following habitat factors affecting vegetation along the seacoast are treated under influences associated with submergence in sea-water; salinity of sea-water, the tides, illumination at different depths, and temperature of sea-water. Physiographic influences, such as erosion and deposition, and atmospheric influences are also discussed. The plant associations of the eroding areas are divided into groups; those of rocky shores and bottoms include the seaweed associations of the sublittoral region, the seaweed associations of the littoral region, and the associations of the supralittoral. For shores and bottoms of glacial drift the same general divisions are made. A short discussion of succession along eroding coasts is given.—P. A. Munz.

105. SCHONLAND, S. Phanerogamic flora of the divisions of Uitenhage and Port Elizabeth. Mem. Bot. Surv. South Africa 1: 7-118. 1919.—The flora is made up of 129 orders, 716 genera, and 2312 species. The proportion of genera to species is 1: 32; of monocotyledons to dicotyledons 1: 2.6. Shore vegetation does not differ essentially from the vegetation in other similar localities along the south coast of South Africa. Halophilous meadows are particularly well developed at and near the mouth of the Zwartkops River and extend on its right bank to beyond Redhouse. The vegetation of the Van Stadens Mountains, apart from patches of thorn scrub and forests, has many features of a southwestern hill vegetation. On the coastal plateau thorn scrub is more frequent and eastern types more prevalent than on the Van Stadens Mountains. Karroid succulent vegetation occupies a large tract of country and is most typically developed in the northwestern parts. Karroid thorn scrub is not always sharply divided from the karroid succulent vegetation; numerous succulents are often mixed with it and patches of pure succulent vegetation frequently occur. Pure *Acacia* formation is not extensive and occurs in the eastern and northeastern portions. Pure grassland formation is found on a large part of the Zuurborg on the "grass ridge" east of Uitenhage and east of the Sundays

River near its mouth. Forest patches occur almost entirely in deep kloofs on the southern side of the mountains and hills close to the sea. From the phytogeographical point of view the divisions suggested by BOLUS are adopted but the eastern boundary of the southwest coast region is placed not at Van Stadens but in a line from Port Elizabeth through the Bethelsdorp hills.—*E. P. Phillips.*

106. THONE, FRANK E. A. Pioneer plants on a new levee.—IV. *Proc. Iowa Acad. Sci.* 25: 423-425. 1920.—The author notes chiefly the destruction of the locality described in three former papers, which describe a ruderal succession. A list of plants noted in 1917 is given.—*H. S. Conard.*

107. TRANSEAU, E. N. Vegetation of Cape Breton. [Rev. of: NICHOLS, G. E. The vegetation of Northern Cape Breton Island, Nova Scotia. *Trans. Connecticut Acad. Arts and Sci.* 22: 249-467. 1918. (See *Bot. Absts.* 1, Entry 833.)] *Plant World* 22: 145-146. 1919.

108. WAKSMAN, SELMAN A. Fungi commonly found in soil. [Abstract.] *Absts. Bact.* 4: 5. 1920.—“Soils, rich in organic matter, will be found to contain, if the moisture and temperature conditions are favorable, an abundant fungus growth. Soils with a low organic matter content may show a fungus growth, under special conditions which are not definitely established as yet, possibly at a high moisture content and at a relatively high temperature. The same species of fungi were found in localities as far apart as Alberta, Canada, Hawaiian Islands, Louisiana, Maine, and newly-formed soils from Tortugas Island. This tends to confirm the fact that even those fungi which have not been demonstrated to exist in a vegetative mycelial stage in all these localities, do produce a vegetative growth. When the conditions become unfavorable for the growth of these fungi, due to the climatic variations, the mycelium may be destroyed, but the spores, which are much more resistant to adverse conditions, survive, only to germinate and produce a fresh vegetative growth when conditions become favorable.”—Organisms are mentioned only by family or genus. [From author's *Abst. of paper read at scientific session, Soc. Amer. Bact.*]—*D. Reddick.*

109. YOSHII, Y. Oekologische Studien über Vegetation der Ota Dünen. [Ecological studies of the vegetation of the Ota dunes.] *Jour. Coll. Sci. Imp. Univ. Tokyo* 43³: 1-68. 2 pl., 8 fig. 1919.—After a bibliographical introduction and a statement of the general characteristics of dune plants, the author discusses the specific influences of position, rainfall, temperature, wind, and other climatic factors on the movement and other behavior of the sands and the plants which live on them and hold them in place.—*G. J. Peirce.*

FLORISTICS

110. BARDIE, A. Tulipes, primevères et anémones dans le Libournais. [Tulipa, Primula and Anemone of Libournais.] *Actes Soc. Linn. Bordeaux Proces-verbaux* 69: 90-92. 1915-16. [Received May, 1920.]—The habitat and distribution of a few interesting plants are briefly described.—*W. H. Emig.*

111. BARDIE, A. Le Mathiola incana et le Daphne laureola à Lormont. [Mathiola incana and Daphne laureola at Lormont.] *Actes Soc. Linn. Bordeaux Proces-verbaux* 68: 84-87. 1914. [Received May, 1920.]

112. BAUDRIMONT, A. Compte rendu de l'excursion faite a Bazas et dans les environs le 1er juin 1914. [Report of the excursion to Bazas on June 1, 1914.] *Actes Soc. Linn. Bordeaux Proces-verbaux* 68: 67-72. 1914. [Received May, 1920.]

113. BOUCHON, M. Excursion aux Quatre-Pavillons. [Excursion to Quatre-Pavillons.] *Actes Soc. Linn. Bordeaux Proces-verbaux* 68: 54-55. 1914. [Received May, 1920.]

114. BOYER, G. Excursion de la Société Linnéenne, le 16 mai 1915, à la propriété Catros. [Excursion of the Linnean Society on May 16, 1915.] Actes Soc. Linn. Bordeaux Proces-verbaux 69: 29-30. 1915-16. [Received May, 1920.]

115. BOYER, G. Compte rendu de l'excursion de la Société Linnéenne à Léognan, le 27 juin 1915. [Report of the excursion of the Linnean Society to Leognan, June 27, 1915.] Actes Soc. Linn. Bordeaux Proces-verbaux 69: 31-32. 1915-16. [Received May, 1920.]

116. BRADSHAW, R. V. Rare plants of Oregon. Amer. Bot. 26: 18-19. 1920.—Notes on the occurrence of *Erodium moschatum*, *Linaria elatine*, *Centaurea nigra*, and *Cynosurus echinatus* near Eugene, Oregon.—W. N. Clute.

117. BURNHAM, STEWART H. The haunts of *Rhododendron maximum*. Torreyia 20: 28-31. 1920.—*Rhododendron maximum* L., a rare plant in New York, was found by the writer in 1904, in Michigan Hollow Swamp, between West Danby and Danby, Tompkins County, New York. About 7 distinct patches were found within a circumference of 600 feet. It is slowly spreading and in no danger of extermination. The plant is described and the associated vegetation indicated. A sketch-map showing the exact location of the station is added.—J. C. Nelson.

118. BURNHAM, STEWART H. The mosses of the Lake George flora. Bryologist 23: 17-26. 1920.—The article covers the families Sphagnaceae to Grimmiaceae (pars), and is to be continued. The author enumerates the sources of information (printed lists, collections, collectors), and attempts to give a comprehensive view of the present knowledge of the moss-flora of the region and of the work previously done. Seventy species besides many varieties are mentioned, under most of which there are detailed citations of localities or collectors.—E. B. Chamberlain.

119. BUSBY, ISABEL. A trip to Gosford. Australian Nat. 4: 125-127. 1920.

120. CHIOVENDA, E. Le piante raccolte dal Dr. Nello Beccari in Eritrea nel 1905. [Plants collected by Dr. Nello Beccari in Eritrea, 1905.] Nuovo Gior. Bot. Ital. 26: 89-114. 1919.

121. CRATTY, R. I. Notes on an introduced woodland flora. Proc. Iowa Acad. Sci. 25: 411-412. 1920.—An account of the woodland plants which appeared spontaneously in a grove in Emmet County, Iowa, which was planted in 1870 on a prairie six miles from native timber. *Liparis loeselii*, two ferns, and several shrubs are named. The locality is now mostly destroyed.—H. S. Conard.

122. C[REEL], E. Excursion to Brookvale. Australian Nat. 4: 141-142. 1920.—List of plants observed in various habitats.—T. C. Frye.

123. FAMILLER, I. Einige kritische Bemerkungen zu J. Röhl, Die Thüringer Torfmoose und Laubmoose und ihre geographische Verbreitung. [Critical remarks on J. Röhl's Thuringian mosses and their geographical distribution.] Krypt. Forsch. Bayerische Bot. Ges. 3: 187-188. 1918.—The remarks criticize or correct certain statements regarding the moss flora of Bavaria, made incidentally by Röhl. Some of these statements relate to Bavarian bryologists and their activities and others to records of Bavarian mosses.—A. W. Evans.

124. FITZPATRICK, T. J. The fern flora of Nebraska—I. Amer. Fern Jour. 10: 5-15. 1920.—The author divides the state into seven regions, discussing the geographic features and listing the species of pteridophytes found in each region. The fern flora of the state is represented by 17 genera and 26 species. An annotated list of species of Ophioglossaceae (2 genera and 3 species), Osmundaceae (1 genus and 2 species), and Polypodiaceae (1 species) is given.—F. C. Anderson.

125. FITZPATRICK, T. J. The fern flora of northeastern Iowa. Proc. Iowa Acad. Sci. 25: 417-421. 1920.—The counties of Winneshiek, Allamakee, Clayton, and Dubuque are in

the "driftless area," with beds of Cambrian sandstones and Lower Silurian limestones and shales. Thirty-three species are recorded, including *Botrychium*, *Osmunda*, *Azolla*, *Selaginella*, and *Isoetes*.—H. S. Conard.

126. GRAFF, PAUL W. Unreported ferns from Montana. Bull. Torrey Bot. Club 47: 125-129. 1920.—*Ophioglossum vulgatum* L., *Cystopteris fragilis* (L.) Bernh. var. *angustata* (Hoffm.) Luers, *Aspidium cristatum* (L.) Sw., *A. Filix-mas* (L.) Schrad., and *A. spinulosum* (O. F. Muller) Sw. var. *intermedium* (Muhl.) D. C. Eaton are given as occurring in Montana, although not previously reported from that state.—P. A. Munz.

127. HAMILTON, A. A. Excursion to Duck River. Australian Nat. 4: 140-141. 1920.—A list of plants observed.—T. C. Frye.

128. HERRE, ALBERT C. Notes on Mexican lichens. Bryologist 23: 3-4. 1920.—A list of 23 species with localities.—E. B. Chamberlain.

129. JENNINGS, O. E. Rarity of *Conopholis*. Amer. Bot. 26: 29. 1920.—*Conopholis* is regarded as not uncommon in Western Pennsylvania. The plants usually occur in elevated, poor, and probably acid soils, in black, red, or chestnut oak woods.—W. N. Clute.

130. KASHYAP, S. R. Distribution of liverworts in the western Himalayas. Jour. Indian Bot. 1: 149-157. 1920.—The author brings together the experience of a number of collecting trips into various parts of the western Himalayas. Liverworts occur at altitudes ranging from 700 feet on the plains to 13,000 feet. Thallose forms predominate. The number of species and individuals increases from the plains up to about 7000 feet, then decreases with higher altitudes; they decrease also in passing from east to west. The outer ranges are richest in species and individuals, the higher middle range stands next, the inner high range has very few, while beyond the inner range there are none. The outer or southern slopes are richer than the inner ones. A total of about 75 species is recorded. Lists of species are given for the various localities; Mussoorie, 78° 5' E. Long., 30° 27' N. Lat., altitude 6-7000 feet, stands first with 42 species.—Winfield Dudgeon.

131. KREBS, CARL. A rare Ohio plant immigrant. Amer. Bot. 26: 1. Pl. 1. 1920.—*Berberis aquifolia* reported as established in the Cuyahoga Valley, Ohio.—W. N. Clute.

132. LLAGNET, M. Liste des plantes récoltées à l'excursion de la fête-Linnéenne. [List of plants collected on the excursion of the Linnean anniversary.] Actes Soc. Linn. Bordeaux Proces-verbaux 68: 83-84. 1914. [Received May, 1920.]

133. LORENZ, ANNIE. Some Hepaticae from Matinicus Island, Maine. Bryologist 23: 1-3. 1920.—The article lists 21 species of hepatics, and contrasts the hepatic flora of Matinicus with that of Mt. Desert.—E. B. Chamberlain.

134. LOWE, RACHEL L. *Rhacomitrium sudeticum*, a moss new to Worcester County, Massachusetts. Bryologist 23: 4-5. 1920.—The moss occurs on Mt. Wachusett. References are included to further New England distribution.—E. B. Chamberlain.

135. MCATEE, W. L. Notes on the flora of Church's Island, North Carolina. Jour. Elisha Mitchell Sci. Soc. 35: 61-75. 1919.—The paper includes a list of seed plants, with three ferns and one alga, collected or noted during several visits in 1909 and 1918. *Ilex vomitoria* is used by the inhabitants for making tea, but they regard *Asimina triloba* as poisonous.—W. C. Coker.

136. MCATEE, W. L. Notes on the jack pine plains of Michigan. Bull. Torrey Bot. Club 47: 187-190. 1920.—A general description is given of the Jack Pine Barrens with lists of some of the plants found.—P. A. Munz.

137. NELSON, JAMES C. A noteworthy grass. Amer. Bot. 26: 10-12. Fig. 1. 1920.—*Coleanthus subtilis* described from the mountains of Bohemia in 1816 was first observed in America at Searles Island, in the Columbia river near the mouth of the Willamette in 1875. It has since been found at Hood River, Oregon, White Salmon and Bingen, Washington. Recently (Oct. 1919) it was reported from Hayden Island opposite Vancouver, Washington, by the author. The mature plant is only a few centimeters in length and the suggestion is made that it may be a native to America frequently overlooked because of its size and lateness in appearing.—W. N. Clute.

138. NELSON, JAMES C. *Tilia europaea* in Oregon. Torreyia 20: 31-32. 1920.—A specimen of *Tilia europaea* L. about 40 feet high was found on June 19, 1919, in the Calapooia Mountains along Smith River, near Gunter, Douglas County, Oregon, apparently perfectly established, and probably a relic of cultivation by an early apiarist, although the mountain-forest was apparently unbroken.—J. C. Nelson.

139. PALMER, ERNEST J. The canyon flora of the Edwards Plateau of Texas. Jour. Arnold Arboretum 1: 233-239. 1920.—The author gives an account of the physiography of the Edwards Plateau and of the general character of its vegetation, which is xerophytic except along the water courses. Particular attention is drawn to the occurrence of *Taxodium distichum* along the lower river courses. The most remarkable feature of the flora is the presence in the upper canyons of small colonies of many species belonging to the Gulf and Atlantic coastal plain flora. These colonies are explained as relics of a former extension of the coastal plain forest across the Edwards Plateau possibly almost to the base of the Rocky Mountains. After the elevation of the region had taken place about the close of the Tertiary period, the climatic changes caused the gradual disappearance of the forest, which was replaced by the semi-desert flora of the southwest and of northern Mexico except in sheltered spots in the canyons where vestiges of the original flora persisted.—Alfred Rehder.

140. QUEYRON, PH. Une herborisation au Pech de Berre, près Arguillon (Lotet-Garonne). [Botanizing at Pech de Berre, near Arguillon.] Actes Soc. Linn. Bordeaux Proces-verbaux 69: 26-29. 1915-16. [Received May, 1920.]

141. SOTH, MRS. BLANCHE H. Wildflower distribution in the West. Amer. Bot. 26: 14-16. 1920.

142. STANDLEY, PAUL C. Sphagnum in Glacier National Park, Montana. Bryologist 23: 5-6. 1920.—The occurrence of 4 species is noted.—E. B. Chamberlain.

143. TADULINGAM, C. Short notes on distribution, etc. Jour. Indian Bot. 1: 125. 1919.—New localities in India are recorded for *Juncus bufonius* L. and *Pyrenacantha volubilis* Hook.—Winfield Dudgeon.

144. VICTORIN, M. Random botanical notes. III. Isle-aux-Coudres, Quebec. Canadian Field-Nat. 33: 114-117. 1919.—The more characteristic plant species of various ecological regions of an island of the St. Lawrence River are enumerated. Several species of *Carex* receive special mention.—W. H. Emig.

145. WATERHOUSE, G. A. Report of the excursion to Narrabeen, 11th October. Australian Nat. 4: 127. 1920.

146. WILSON, E. H. The Liukiu Islands and their ligneous vegetation. Jour. Arnold Arboretum 1: 171-186. 1920.—An account of the woody plants of the Liukiu Islands is given, preceded by introductory notes on the geography, history, and population of the islands. The flora of the northern group of islands is related to that of Japan, that of the southern group to the flora of Formosa. The vegetation is characterized by the evergreen shining foliage of most of the woody plants and by the presence of Mangrove-like trees, *Cycas*

revoluta, *Pinus luchuensis*, and two palms. The flora contains according to our present knowledge 351 species and 23 varieties representing 233 genera; a considerable number of the species and most of the varieties are endemic. A systematic enumeration of the woody plants concludes the article and contains a new species, a new variety, and a new combination: *Elaeagnus liukiensis* Rehd., *Rhamnus davuricus* var. *liukiensis* Wils., and *Zanthoxylon okinawensis* (Nakai) Wils. A list of the woody plants of the Kawanabee Islands, which connect Japan and the Liukiu Islands, compiled by USHIWO is appended.—*Alfred Rehder*.

APPLIED ECOLOGY

147. NAUMANN, EINAR. Tillämpad limnologi. Några teoretiska grundlinjer för en rationell vattenkultur. [Applied limnology. Some theoretical principles of a rational water culture.] K. Landtbr. Akad. Handl. och Tidskr. 58: 199-221. 1919.—A discussion of plankton in relation to environmental conditions, methods of improvement, and utilization as fish food.—*E. G. Anderson*.

FORESTRY AND FOREST BOTANY

RAPHAEL ZON, *Editor*

J. V. HOFMANN, *Assistant Editor*

(See also in this issue Entries 48, 82, 86, 89, 422, 505, 572, 576, 688)

148. ANONYMOUS. Distillation of sandal oil. Australian Forest. Jour. 3: 316-318. 1920.—A note on the recently developed sandalwood oil industry in Western Australia.—*C. F. Korstian*.

149. ANONYMOUS. Forest trails and highways of the Mount Hood region, Oregon National Forest, Oregon. U. S. Dept. Agric. Dept. Circ. 105. 32 p., illus. 1920.

150. ANONYMOUS. Ironbark versus jarrah. Australian Forest. Jour. 3: 239. 1920.—A note on a test conducted by WARREN of Sydney University to determine the comparative strengths of New South Wales *Eucalyptus paniculata* and *E. marginata*. As a result of a simple cross breaking test the former (iron-bark) proved the stronger of the 2 species.—*C. F. Korstian*.

151. ANONYMOUS. A mountain vacation land. U. S. Dept. Agric. Dept. Circ. 132. 10 p., illus. 1920.

152. ANONYMOUS. A new textile from the bark of the "silkworm mulberry." Sci. Amer. Monthly 2: 152. 1920.

153. ANONYMOUS. Snöbrott och topröta hos granen. [Snow breakage and top rot in spruce.] Skogsvårds Föreningens Tidskr. 17: 173x-181x. 1919.—The article reports a discussion by Swedish foresters of an address on the above subject by T. LAGERBERG at the annual meeting of the association, March 15, 1919.—*G. A. Pearson*.

154. ANONYMOUS. A thinning area re-visited. Australian Forest. Jour. 3: 251-254. 1920.—A brief discussion of the failure of the seedling crop in rather heavily thinned stands of *Eucalyptus*, which is attributed to: (1) Heavy grazing and rabbit injury in dry years, the latter being the principal cause of the damage, leaving the forest dependent on coppice for regeneration; (2) removing all mature standards and not leaving seed trees, the immature standards being too young to produce seed; and (3) the absence of humus, which is regarded as a minor cause.—*C. F. Korstian*.

155. ANONYMOUS. The timbers of commerce. [Rev. of: HOWARD, A. L. A manual of the timbers of the world, their characteristics and uses. xvi + 446 p. Macmillan and Co.: London, 1920.] Nature 106: 80-81. 2 fig. 1920.—“Mainly a descriptive account of the commercial uses. . . . practically confined to those imported into London and Liverpool. . . . book, in short, is excellent on the commercial side.”—O. A. Stevens.

156. ARENS, P. Ziju aan het tappen met driptris voordeelen verbonden? [Does tapping with driptris give any advantage?] Mededeel. Proefsta. Malang [Java] 25. 1-16. 1919.—Reprinted from the Arch. Rubbercult. 3: 36-41. 1919.—Carl D. La Rue.

157. BENNETT, H. C. Progress report of forest administration in Coorg for 1918-19. 27 p. Bangalore, British India, 1920.—An annual report with appended tabulated data. The reserved forests now total 520 square miles. The proportion of total forest area open to cattle increased from 71 to 86 per cent and the number of animals grazed increased from 2985 to 13,376. All spike experiments with sandal by burning the area have given negative results with one exception where a tree was found to have become spiked by this treatment. Owing chiefly to reduction in output and decrease in price of sandalwood the revenue of the province fell below that of the previous year.—E. R. Hodson.

158. BLUNT, A. W. Progress report of forest administration in the province of Assam for 1918-19. 59 p. Shillong, British India, 1919.—An annual report covering in some detail all forest operations. At the end of the year the total area of the reserved forests of the province was 5495 square miles representing a net increase in the last five years of 1,114 sq. mi. Owing to reservation of forests and the extension of cultivation, the area of unclassified State forests was reduced by the close of the year to 10,050 sq. mi. The total decrease during the last five years was 2092 sq. mi. A systematic division of waste lands into those suitable and those unsuitable for reservation, which will greatly help in establishing a definite scheme of reservation, is now being made. During the last five years the annual surplus has averaged 450,516 Rs. The forest devastation caused by sugarcane cultivation is noted. “It is the most destructive of all forms of shifting cultivation, and after a crop of sugarcane has been taken off an acre for 3 or 4 years in succession nothing will grow except weeds and hardy shrubs like the *Eupatorium oderatum*.” A species of *Peridermium*, closely allied to *P. cerebrum* Peck, is attacking *Pinus khasya* but is confined to elevations over 5500 feet. A report was submitted on the damages caused by floods and protection of catchment areas at the head-waters of rivers, but action has been postponed until the services of a special officer become available. The usual formal tabulated summaries are appended and a map of the province is included.—E. R. Hodson.

159. BOAS, I. H. The manufacture of alcohol from waste wood or sawdust. Australian Forest. Jour. 3: 269-270. 1920.—The development of this industry is traced especially with reference to conditions in America.—C. F. Korstian.

160. CARLETON, M. B. The soap nut tree. Amer. Forestry 26: 621. 1 fig. 1920.

161. DACY, G. H. Where willow ware comes from. Sci. Amer. 123: 222, 235. 5 fig. 1920.—How the willow tree is grown and tended to yield the raw materials of furniture and basket factories.—Chas. H. Otis.

162. DIEDEN, HENRIK. Om Skögsförhållandena på Island. [Forest conditions in Iceland.] Skogen 6: 293-300. Fig. 1-7. 1919.—About 1000 years ago when Iceland was colonized by the Vikings large portions of the island were forested. The forests, however, were gradually destroyed by cutting and fire followed by drifting sands, while sheep grazing prevented or at least greatly interfered with reproduction. At present 500 square kilometers are classified as forest land, but of this only 500 hectares are forested. Practically all lumber is now imported from Sweden and Norway. High prices incident to transportation charges have necessitated the use of all kinds of wood substitutes for fuel and construction. Steps are now

being taken to re-establish the forests by planting (mainly experimental) and by fencing partially wooded areas against sheep. Only the native birch and possibly Siberian larch give promise of success in forestation. Exotics planted at the experiment station at Aukureyri have not proved satisfactory. Failure is attributed primarily to a moisture deficit brought about by the combined action of a fine impermeable soil and excessive transpiration due to high winds.—G. A. Pearson.

163. GIBSON, A. J. Development of turpentine industry in Germany during the war. *Indian Forester* 46: 525-531. 1920.—A short review of a number of papers given in the bibliography (17 titles) covers in a general way the development of the industry in Germany.—E. N. Munn.

164. GILL, WALTER. Fire protection. *Australian Forest. Jour.* 3: 199-201. 1920.—A paper read at the Hobart Forestry Conference. The author discusses the subject of fire protection in Australia under the following heads: (1) Fire-breaks, (2) fire-towers, (3) telephones, (4) fire-fighting equipment.—C. F. Korstian.

165. GRAVES, HENRY S. The Northern Pacific Railway or the nation—which? *Jour. Forestry* 18: 675-680. 1920.

166. HATTON, JOHN H. Live-stock grazing as a factor in fire protection on the national forests. U. S. Dept. Agric. Dept. Circ. 134. 4-11, pl. 1-5. 1920.

167. HAY, R. D. Report of the forestry commission for year ending June 30, 1920. 34 p., illus. Sydney, New South Wales, 1920.—A revised scheme of forest management requiring stricter regulation and control over forest working, more complete and systematic utilization of timber and other forest products and payment therefor, has been established. In some cases the Commission had to undertake the felling and direct conversion of standing timber to remedy wasteful practises. A training school for forestry students was opened with seven students during the year.—The State forests now total 5,085,050 acres. *Zamia palm (Macrozamia spiralis)* was investigated as a source of industrial alcohol, the bulbs yielding 13.3 gallons per ton and 8.19 per cent starch. Mountain ash (*Eucalyptus gigantea*) excelled other timbers for airplane construction. Mountain gum (*E. dalrympleana*), blackbutt (*E. pilularis*), and spotted gum (*E. maculata*) are to be tested on a commercial scale for paper pulp value, as these species can be supplied in fair quantity in connection with the working and silvicultural treatment of the State Forests. Mangrove is important in oyster culture and in protecting foreshores from erosion; but owing to the difficulty of supervision, the areas below high-water mark are being turned over to fishery officials.—E. R. Hodson.

168. HELMS, J. Egene i Silkeborgegnen. [The oaks around Silkeborg.] K. Veterinaer og Landbohøjskole Aarskr. 1920: 197-222. Fig. 1-18. 1920.—In Denmark *Quercus pedunculata* is the common species, and only in northern Jutland is *Q. sessiliflora* found to any extent, where it is planted only as a part of the original natural forest. Hybrids of the two species are also found. From 1820 to 1905 only small quantities of the two species were planted, but in latter years larger areas have been laid out with oak. The remaining old oaks in the Silkeborg forests cannot be regarded as typical of the original oak forest; they have been left because of their bad form or inaccessibility. Although the wood is injured by frost cracks, and the young leaves by late frosts, *Q. sessiliflora* is better adapted for the locality than the other species.—Ernst Gram.

169. HOWARD, S. H. Poisoning *Bauhinia vahlii*. *Indian Forester* 46: 562-572. 1920.—A number of poisons variously applied were tried to develop an effective method of killing climbers. The results were rather inconclusive. However, one application of mercuric chloride or sodium arsenite to the cut and split ends sufficed to kill the climbers. Root sprouting does not seem to be prevented.—E. N. Munn.

170. JOHNSON, F. R. Forests in the sand hills. Amer. Forestry 26: 582-584. 4 fig. 1920.—One of the first forest plantations in western Nebraska was established in 1891. Jack, Scotch and yellow pine were used, with good results. In 1903 a plantation was established with jack pine seedlings from the forests of Minnesota. These trees are now 20-25 feet in height and forest conditions prevail. Nurseries with a large annual output have been established. Western yellow pine (*Pinus ponderosa*) and jack pine (*Pinus divaricata*) are best adapted to this region. Three-year old transplants are used and planted in furrows. Method of planting and special tools used including the "trencher," are discussed. Fire protection has been very effective, fire lines a rod wide dividing the plantations into units of about 160 acres.—Chas. H. Otis.

171. JUDD, C. S. The first algaroba tree in Hawaii. Amer. Forestry 26: 605-606. 2 fig. 1920.—The characteristics and uses of *Prosopis juliflora* DC. are discussed.—Chas. H. Otis.

172. KRAUCH, HERMANN. The use of stand graphs in determining the limitation of cut. Jour. Forestry 18: 719-722. 1 fig. 1920.—To properly mark a stand for cutting rate of growth and volume on the ground should be known, but unless the marker keeps a record of the cut and what remains, there is no way to determine the amount left on the ground. A method of determining the safe diameter limit and how much remains on the ground is described. Charts show the per cent of trees of each diameter class on a sample plot and the per cent of the volume in each of these classes for each species. When the final stand is decided upon, by using these percentages, the volume to be cut may be arrived at by cutting each species to a diameter limit.—E. N. Munnis.

173. LAGERBERG, TORSTEN. Snöbrott och toppröta hos granen. [Snow breakage and top rot in spruce.] Meddel. Statens Skogsförsöksanst. 16: 115-162. Fig. 1-11. 1919.—Working plans are often seriously disrupted by snow damage. The calculated annual yield may be greatly increased by the salvaging of fallen or badly injured trees. Even uninjured trees must sometimes be cut in order to save them from windfall or drought. Until recently it has been a difficult problem to decide what character and degree of damage is permissible in trees which are left. The present investigation shows that broken stems are almost invariably attacked by rot, and therefore should be removed from the stand. The rot progresses more rapidly in rapidly growing than in slow growing trees. Callus and exudations from the wound may delay and in rare cases prevent infection.—G. A. Pearson.

174. LANE-POOLE, C. E. Report of the Forests Department for the year ended 30th June, 1920. Ann. Progress Rept. Forests Dept. Western Australia. 30 p. Perth, 1920.—The work of the Department for the fiscal period is briefly summarized under the following captions: "Classification of forests, reservations, forest work, forest ranging and timber inspection, plantations and nursery work, timber industry, kiln drying, firewood, mining timber, revenue and expenditure, botanical, entomological, tan barks, commonwealth forest products laboratory, sandalwood, kingia grass tree fiber industry, regulations, interstate forestry conference, publicity and staff." The total area classified to date amounts to 3,550,000 acres. A start was made in the preparation of two preliminary working plans. Western Australia is awakening to the possibilities of kiln drying. The overcutting of the sandalwood supplies of the State is causing considerable concern. The organization of the Department was delayed through the impossibility of obtaining the necessary staff. The report is appended by detailed statements of revenue and expenditure; production of mill timber and lists of concessions; leases; sawmill, hewing, firewood, sawmilling, and miscellaneous permits; herbarium specimens collected and identified; trees grown and planted at the Hamel State Nursery; forest insects in the departmental collection; and particulars of prosecutions during the year.—C. F. Korstian.

175. LEAVITT, CLYDE. The British Empire forestry conference, 1920. Jour. Forestry 18: 669-675. 1920.—Foresters from twenty-three countries in the British Empire met in July, 1920 and decided upon a definite plan of action. Some of the more important measures to be

put into effect in each of the countries are: (1) The adoption of a forest policy enforced by foresters; (2) a survey of the resources of which there is no definite knowledge at present; (3) the development of a personnel to handle forestry matters under constitutional authority; (4) organization of forest industries; (5) education and publicity; (6) distribution of free plants for tree planting; (7) development of forest research by the states; (8) the establishment of a forestry bureau.—*E. N. Munnis*.

176. LEE, YIN KUNG. [A comparative study of Chinese and Japanese forestry.] Khu-Shou [Science-Publ. Chinese Sci. Soc.] 5: 832-841. 1920.—The author presents a comparison of the present state of forestry in China and Japan, and discusses fully forestry administration and management in the two countries.—*Chunjen C. Chen*.

177. MAAS, J. G. J. A. Een duffelmes voor het maken van Hevea plakoculaties. [A double knife for making patch buddings on Hevea.] Mededeel. Alg. Proefsta. A. V. R. O. S. [Medan, Sumatra] Rubberserie 23. 1919.—A reprint from Arch. Rubbercult. 3: Alg. Gedeelte 73-75. 1919.—*Carl D. La Rue*.

178. MAAS, J. G. J. A. A. Gewijzigde methode voor veldproeven bij Hevea. B. Nog eenige keimprouven met Hevea zood. [A. Other methods for field experiments with Hevea. B. Further germination trials with Hevea seed.] Mededeel. Alg. Proefsta. A. V. R. O. S. [Medan, Sumatra] Rubberserie 19. 1919.—A reprint from Arch. Rubbercult. 3: 233-245. 1919.—*Carl D. La Rue*.

179. MAAS, J. G. J. A. Vegetatieve voortplanting von Hevea brasiliensis. [Vegetative reproduction in Hevea brasiliensis.] Mededeel. Alg. Proefsta. A. V. R. O. S. [Medan, Sumatra] Rubberserie 20. 1919.—A reprint from Arch. Rubbercult. 3: 280-312. 1919.—*Carl D. La Rue*.

180. MACKAY, H. Forestry in Victoria. Australian Forest. Jour. 3: 212-215, 246-248. 1920.—The present are the fourth and fifth (concluding) installments of this paper. Coniferous plantations in southeastern Australia are considered with special reference to the relative merits of different species. *Pinus radiata*, *Pinus laricio*, *Pseudotsuga taxifolia*, *Picea sitchensis*, and *Pinus ponderosa* are discussed quite extensively. Mention is made of the climatic effect of tree denudation and the establishment of a forest school at Creswick.—See also Bot. Absts. 6, Entry 1038; 7, Entry 133.—*C. F. Korstian*.

181. MAYES, W. Progress report on forest administration in the Punjab for 1918-19. 133 p., 1 map. Lahore, British India, 1919.—At the end of the year the forest areas in square miles were: Reserved, 1747; protected, 4169; unclassified, 767; leased, 361. Fire devastated 3.17 per cent of the total area. In the irrigated plantations 1575 acres were sown, bringing the total area to 6123 acres. The cut of timber during the year in cubic feet was 7,243,000, and of firewood 27,158,000. At the Jallo factory 28,778 Maunds (maund = 80 pounds) of resin were distilled as compared with 16,426 in the previous year. The surplus fell from 934,704 Rs. the previous year to 568,472 Rs., due largely to cancellation of war contracts. It is stated that the time has now come for developing the hill forests by intensive management and working to the utmost capacity the irrigated plantations in the plains. Further postponement of this development is no longer desirable. At present the greatest needs of the department are an increased staff and an extended use of mechanical appliances for extraction coupled with improved communications. Staff is needed especially for the revision of working plans, the application of specialized engineering methods, investigation and opening of new markets, development of new industries, and for research work in silviculture and forest economics. In Bashahr the produce of thinnings, formerly unsalable, is being profitably exported. In the Pabbi, natural reproduction of *Prosopis glandulosa* continues to be good, but other species were mostly killed by drought. Spruce timber suitable for airplane manufacture is not likely to be obtainable from Bashahr, as it is too knotty and the river Sutlej and its tributaries are so rough that the driving of long scantlings is difficult. Kulu is a promising source of supply, as the driving conditions there are much better. Experiments (as with ban

oak in Kangra) have shown that *Acacia modesta* in Jhelum and Rawalpindi can be coppiced at any season of the year without trimming the stumps. In Lahore it is found that shisham seed collected from coppice is as good for cultural purposes as that from seedling trees. While difficult, an attempt will be made to control the shisham fungus by the use of watering trenches instead of flooding the whole area. Yield tables have been completed in Kulu during the year for deodar, blue pine, Chil, and fir. From ten years' observations and experiments it is concluded that the shelter-wood compartment system is the best method of insuring the regeneration of the coniferous forests of Kulu, and this system is therefore being adopted in the new working plan for the locality. European larch is doing well experimentally in Kulu. Various species of *Eucalyptus* in the Simla hills in experimental plantings still give no encouragement. The time seems at hand for appointing a Utilization Conservator (as in the United Provinces) for the Punjab to be the business head of the Department and control all its timber works, the sale of timber, the resin industry, and be in charge of the development of new markets and industries. The Government of India is considering co-operation of the Punjab with the North-West Frontier Province and Baluchistan with this idea in view, and also a plan of administrative reorganization.—*E. R. Hodson.*

182. PALMER, ANDREW H. Economic results of deficient precipitation in California. Monthly Weather Rev. 48: 586-589. 1920.—Because of markedly deficient precipitation in northern and central California during the past 4 rainy seasons serious loss resulted during the dry season of 1920. Streams reached the lowest stages on record. The Sacramento River at Sacramento fell below mean sea level, and the current of the stream was reversed. The saline waters of San Francisco Bay encroached upon rich agricultural lands of the delta region, reducing the vegetable crops, driving the dairy industry to other regions, and threatening irreparable damage to alluvial soils through the infiltration of salt water. The teredo, or "ship worm," a minute salt-water organism, did great damage to wooden structures. The average yield per acre of many crops was reduced in 1920 because of deficient moisture. Rice growers felt the drought keenly, because of the large water requirements of rice. Hydroelectric power shortage resulted in power restrictions and higher rates. Wells went dry because of the lowered level of ground water. Forest fires were more frequent and destructive than in past years, owing to the parched condition of the forests.—*Author's abstract.*

183. PEARSON, R. S. The utilization of bamboo for the manufacture of paper pulp. Indian Forester 46: 547-561, 603-631. 2 pl. 1920.—The supply of pulp woods is getting lower throughout the world and the price and demand are rising. Paper companies are now turning to plants other than trees and the bamboo has been found to be suitable for ground and sulphite pulp. Data are given on the probable yields, costs of extraction, location of mills, etc., for the various localities in India where pulp material exists in sufficient quantity to warrant the establishment of pulp mills.—*E. N. Munnis.*

184. PEMBERTON, C. C. Living stumps of trees. Amer. Forestry 26: 614-616. 6 fig. 1920.—There are instances of stumps of cut trees which do not die, and which retain their vitality to a surprising extent and apparently without the aid of foliage. It is concluded that the union or indirect grafting of roots of the cut stump with those of living trees standing adjacent accounts for the phenomenon.—*Chas. H. Otis.*

185. PERROT, EM. Notes biologiques sur les Acacias fournisseurs de gomme, dite arabique, au Soudan égyptien. [Biological notes on the Acacias producing gum arabic in Egyptian Sudan.] Compt. Rend. Acad. Sci. Paris 171: 258-268. 1920.—The method of making the incision is described as is also the process of healing. The season for flowing is from May to October.—*C. H. Farr.*

186. PETRIE, W. B. Effect of cultivation on tree growth. Australian Forest. Jour. 3: 231. 1920.—A note on the increased growth of *Agathis robusta* and *Grevillea robusta* due to cultivation.—*C. F. Korstian.*

187. PETRINI, SVEN. Några sympunkter på variations—och korrelationsräkningar. [Notes regarding variation and correlation calculations.] Skogsvårdsföreningens Tidskr. 17: 238x-243x. 1919.—A reply to criticisms by L. MATTSSON MÄRN of Petrini's investigations on the use of the "form-point" method in determining form-class and volume.—*G. A. Pearson.*

188. PETRINI, SVEN. Formhöjdstillväxten i tallbestånd inom Västerbottens Län. [Increment per cent of the form-height in pine stands in Sweden.] Meddel. Statens Skogsförsöksanst. 16: 184-187. Fig. 1. 1919.—Volume increment per cents are calculated from the basal area increment per cent and the "form-height" increment per cent. The latter term expresses the product of height and form factor. If tables of "form-height" increment per cent are available the increment per cent may be ascertained by merely measuring diameters. JONSON has prepared such tables for pine in middle Sweden. Petrini, following Jonson's procedure, has prepared similar tables for northern Sweden, where the pine has a different form. The method which is briefly described involves the measurement of heights and the determination of "mean form class" by means of the "form-point" and Jonson's function between "form-point" and "form-class."—*G. A. Pearson.*

189. PETRINI, SVEN. Om formpunktsbedömning. [The "form-point" as an expression of trunk-form.] Meddel. Statens Skogsförsöksanst. 16: 164-183. Fig. 1-5. 1919.—The investigation aims to test the accuracy of JONSON's "form-point" method of estimating volume and taper when applied to different stands and individual trees, and also the variations in results obtained by different persons. Estimates were made on 54 sample plots each having an area of 0.6 acre. On 10 of the plots the "form-point" was determined by 6 different persons. Estimates for single stands show an average deviation of ± 4 per cent of the height of the tree. The average personal error for a stand was 1.17 per cent. Estimates of individual trees by different persons varied as much as 10 per cent. The author concludes that the "form-points" of single trees can not be estimated with any great degree of accuracy, but that the average "form-point" of a stand can be satisfactorily determined.—*G. A. Pearson.*

190. PINCHOT, G. Pennsylvania chestnut trees to be sold to save timber left by blight. Amer. Nut Jour. 12: 91. 1920.—For the last 15 years all efforts to control blight have failed. The removal of trees for use as timber is proposed.—*E. L. Overholser.*

191. RAO, B. I. SHAMA. Note on the artificial raising of bamboos in the Akola division of the Berar Circle, C. P. Indian Forester 46: 518-525. 1 pl. 1920.—Bamboo has been successfully introduced by sowing and planting in the Central Provinces. Watering and cultivation are helpful to both seedlings and transplants, but the latter may succeed with little outside assistance if under a high cover as in the forest. Grazing and fire are destructive and must be prevented in areas recently planted.—*E. N. Munnis.*

192. RICHARDS, EDWARD C. M. Forest conditions and primitive forest practice in West Persia. Jour. Forestry 18: 710-718. 1920.—Zoroastrianism, or fire worship, before the Moslem conquest of Persia is responsible for great ash heaps where the ancient Parsees kept the eternal fires of their shrines burning, and these ash heaps are probably the remains of the former forest. Though the people are dependent on the water supply to keep their lands productive, the lack of a forest cover in the mountains is not appreciated and crop failures and famines are frequent. Fuel woods are scarce and nearly all bushes and weeds are gathered for fire. In scattered places and at considerable distances from habitations, junipers, almonds, and haws were found growing naturally without irrigation. Poplar is the chief tree and is kept trimmed down to a small top so that it forms a long slender pole. The wood is the chief supply of the country. Willows growing along water courses are used for fuel and water pipes. Pollarding and coppicing is the rule, cutting every three years. Other trees of value are the plane, elm and walnut. Persia is in great need of forestry but the political situation is such that it is as yet far off.—*E. N. Munnis.*

193. SABROE, AXEL S. *Flaadning i Siam och Japan*. [Log driving in Siam and Japan.] Skogsvårdsföreningens Tidskr. 17: 281-304. Fig. 1-18. 1919.

194. SALISBURY, E. J. [Rev. of: BAKER, R. T. *The hardwoods of Australia and their economics*. xvi + 522 p., 134 colored pl., 192 fig. Dept. of Education: Sydney, 1919.] Sci. Prog. [London] 14: 689-691. 1920.

195. SALISBURY, E. J. [Rev. of: HICKEL, R. *Graines et plantules des arbres et arbustes indigènes et communément cultivés en France*. (Seeds and seedlings of trees and shrubs indigenous and commonly cultivated in France.) Part I. Conifers. 182 p., 93 fig. Part II. Angiosperms. 349 p., 2 pl., 85 fig. Published by the author: Versailles, 1911 and 1914; received 1919.] Sci. Prog. [London] 14: 691-692. 1920.

196. SHERRARD, E. C., AND G. W. BLANCO. *The preparation and analysis of cattle food, consisting of hydrolyzed sawdust*. Jour. Indust. Eng. Chem. 13: 61-65. 1921.—Sawdust is hydrolyzed with 1.8 per cent sulphuric acid for 15 or 20 minutes under a steam pressure of 120 pounds. The resulting liquor is neutralized and evaporated under reduced pressure to the consistency of a thick syrup. The syrup is mixed with the sawdust residue and dried.—*Henry Schmitz*.

197. SINTUREL, E. *La forêt de Fontainebleau de 1789 à 1794*. [The forest of Fontainebleau from 1789 to 1794.] Rev. Eaux et Forêts 58: 218-226, 255-263, 281-288. 1920.—See Bot. Absts. 7, Entry 708.

198. SPARHAWK, W. N. *Suggestions for rating risks in forest insurance*. Jour. Forestry 18: 701-709. 1920.—Fire insurance rates for forests should be determined along lines similar to those followed in other kinds of insurance, an outline of which is given. The damage by a forest fire depends on the area burned and the relation between values before and after the fire. Area depends on the number of fires, and the number of the contributing causes. The area burned per fire depends on climate and type as well as inflammability, as do also the values at stake and destroyed. A classification of forest risks is suggested based on climate, on forest types, on age groups, on inflammability, and on occurrence. The loss costs may then be determined by a method similar to that employed in the ordinary form of insurance and it should take but a short time to determine these losses if all agencies cooperate for a few years.—*E. N. Munns*.

199. STARTE, H. W. *Anjan (Hardwickia binata) coppice*. Indian Forester 46: 641-647. 1920.—The best season for coppicing this species is between August and November, the worst from May to July. The height of the stump influences the reproductive power, 12 to 18 inches furnishing the strongest shoots and below 12 the weakest.—*E. N. Munns*.

200. STARTE, H. W. *Further experiments in Salai (Boswellia serrata) tapping in the Shirpur east range of N. Khandesh Division*. Indian Forester 46: 578-580. 1920.—Trees with green bark yield more gum-oleo-resin than dry-barked trees; those with short boles yield less than those with long boles; and hollow trees yield more "drip" than sound ones though the total yield is less. Heaviest yields were secured in the dry season and the best in the fourth month after tapping.—*E. N. Munns*.

201. SUDWORTH, GEO. B. *Unique example of the propagation of sugar maple from a cutting*. Amer. Forestry 26: 625. 2 fig. 1920.

202. SWAIN, E. H. F. *The financing of forestry*. Australian Forest. Jour. 3: 279-283, 300-305. 1920.—A paper read at the Hobart Forestry Conference. The insolvency of forestry in Australia, the responsibilities of the Australian Forest Services, timber imports, the colossal post-war timber requirements, financial reform, proper selling methods, efficient forest organization including adequate finances, the subsidizing of forestry and the need for an effective timber tariff are treated, followed by a round-table discussion.—*C. F. Korstian*.

203. SYLVEN, HELGE. Skogsvårdsförhållandena i Nordamerikas Förenta Stater och dess skogars framtid. [Forestry and the forest outlook in the United States of America.] Skogen 6: 257-271. Fig. 1-10. 1919.—The article gives a survey of the country's original and present timber resources; it rehearses the well known story of forest devastation which has led to the present agitation for a national forest policy. The provisions of the policy proposed by the U. S. Forest Service are outlined. Considerable space is given to the organization of the Forest Service. The author welcomes the entrance of the U. S. A. into the field of forestry as an important step toward the welfare, not only of the country itself but of the entire world. Expression is given to the idea that the forest question before the industrial world is no longer one of commercial competition, but how best to meet the problems of production, distribution, and utilization with a view toward supplying the needs of all countries. It is prophesied that the United States will rapidly take a place among European nations in the practise of forestry once the control of forest affairs is placed in the hands of the American foresters, to whose ability and enthusiasm he pays a high tribute.—G. A. Pearson.

204. TOUMEX, J. W. Reshaping our forest policy. Sci. Monthly 12: 18-35. 1921.—The failure of the U. S. A. to retain control of the forests and the consequent exploitation by private owners without reference to continuation of the forest has resulted in an acute situation. The lumberman and paper manufacturer, as well as the forester, are beginning to realize the necessity of a change, especially in view of the increasing prices of forest products. —Three leading policies are now before the country: (a) The program of the committee of the Society of American Foresters; (b) the program of the American Paper and Pulp Association and various lumber interests; (c) the program of Colonel H. S. GRAVES, former Chief of the United States Forest Service. These do not differ in desired results, but in methods of attaining them. The first proposes that laws be enacted by Congress imposing severe penalties on private owners who do not organize their property and practise forest renewal. The second insists that through co-operation and financial support the nation and the states make sustained yield on privately owned forests attainable without loss to the owner. The last urges that the state enforce mandatory regulations and provide adequate assistance in co-operation with the National Government to make forest renewal certain. Under this plan federal legislation would control extension of national forests, co-operate with the states in forest protection and silviculture and have control over such questions as forest taxation and insurance, loans on growing timber, land classification, forest surveys. State legislatures would enact laws holding private owners responsible in case of forest devastation. This plan would necessitate effective measures for organization, police regulations for fire control, effective disposal of slash in all cutting operations, establishing cutting methods suited to each forest type, etc.—L. Pace.

205. TURNER, E. P. Report of forestry department of New Zealand for year ending March 31, 1920. 36 p. Wellington, New Zealand, 1920.—An annual report covering all forest operations. During the last session of the General Assembly the State Forests Act of 1908 was amended to provide for the proclamation of national-endowment lands as provisional state forests. 3,311,000 acres of Crown lands and 56,066 acres of national-endowment lands were proclaimed provisional State forests during the year under recent legislative enactments. While largely forest of a protective character, a considerable area carries forest of present value for milling. The use of firewood for domestic purposes requires encouragement in every reasonable way. Coal is increasing in value and its use should be confined to those purposes for which firewood is not a satisfactory substitute. Approximately 11,724,000 trees were raised in the four State nurseries the past year: 3,710,900 were sent to various plantations and 277,235 to farmers and local bodies. A valuable and exhaustive report by Sir D. E. HUTCHINS on the forests of the North was published during the year.—E. R. Hodson.

206. WIMBUSH, A. Prolific growth of root-suckers in *Dalbergia latifolia*. Indian Forester 46: 573. 1 pl. 1920.—Roots cut off at a depth of four feet send up strong shoots from that portion not connected with the parent tree.—E. N. Munnis.

207. ZON, RAPHAEL. The outlook for extending American lumber trade in Italy. Jour. Forestry 18: 723-730. 1920.—Prior to the European war, the Italian forests were being greatly overcut in spite of heavy importation from other countries. During the war, the home forests were badly depleted and injured by indiscriminate and heavy cutting. Italy now finds herself with new provinces with new sources of wood supply; but with the need of recuperation in her own forest area and the increased demand, Italy will need much additional lumber. The price of lumber in America and the prevailing exchange rates prevent this country from furnishing much of a supply; but the new countries around the Mediterranean should be able to supply much of the demand.—*E. N. Munns.*

GENETICS

G. H. SHULL, *Editor*

J. P. KELLY, *Assistant Editor*

(See also in this issue Entries 29, 47, 53, 74, 371, 375, 383, 506)

208. ALMQUIST, ERNST. Studien über *Capsella bursa-pastoris* (L.). II. [Studies on *Capsella bursa-pastoris* L. II.] Acta Horti Bergiani 7: 41-95. 16 fig. 1921.—Describes 200 species of *Capsella bursa-pastoris* based on the constancy of differentiating features when grown for two or three generations in the experimental garden. Unlike the author's earlier study in this genus, in which the classification was based chiefly on foliage characters, the forms described in the present paper are distinguished chiefly on the basis of form and size of capsules. The author notes that some natural crossing occurs, and promises a further contribution dealing with crossing and mutation in this genus. He groups the species into twelve classes, named as follows: (1) *Concaviformes*, (2) *Scolioticae*, (3) *Rubelliformes*, (4) *Corculatae*, (5) *Cordatae*, (6) *Otites*, (7) *Cuneolatae*, (8) *Triangulares*, (9) *Heterocarpae*, (10) *Lanceolatae*, (11) *Convezae*, (12) *Hiantes*; but these groups are not described and the figures do not allow a clear conception of their differentiating features. *Capsella apetala* Opitz, *C. integrifolia* Retzius, and *C. pinnatifida* Schlechtendal are found to occur associated with very diverse characters belonging in different groups. These are therefore not species nor constant varieties but mixtures of forms having different natural affinities.—*Geo. H. Shull.*

209. ALVERDES, FRIEDRICH. Rassenstudien an Fischen aus dem Carlsberg-Laboratorium in Kopenhagen. [Racial studies on fish from the Carlsberg Laboratory in Copenhagen.] Zeitschr. Indukt. Abstamm.- u. Vererb. 24: 167-169. 1920.

210. ALVERDES, FRIEDRICH. Die Vererbung von Abnormitäten bei Cyclops. [The inheritance of abnormalities in Cyclops.] Zeitschr. Indukt. Abstamm.- u. Vererb. 24: 211-278. 1920.

211. ANCEL, P. Sur l'hermaphrodisme glandulaire. [On glandular hermaphroditism.] Compt. Rend. Soc. Biol. Paris 83: 1642-1644. 1920.

212. ANONYMOUS. Families of the first born. Jour. Heredity 10: 160. 1919.—Notice of article by CARL E. JONES in Quarterly Publication of American Statistical Association for December, 1918.—*Howard J. Banker.*

213. ANONYMOUS. Genetical Society's visit to Reading. Gard. Chron. 68: 42. 1920.—Brief account of a visit of the Society to breeding and testing grounds of Sutton & Sons, Reading, England. Mention is made of crosses in dwarf beans, brassicas, marrows, sweet peas, sun flowers, etc., and this firm is stated to have one of the largest botanical collections of peas in existence.—*J. M. Shull.*

214. ANONYMOUS. [Rev. of: BATESON, W. Genetic segregation. Proc. Roy. Soc. London B, 91: 358-368. 1920. (See Bot. Absts. 8, Entry 226.)] Nature 105: 531. 1920.

215. ANONYMOUS. The inheritance of blindness. [Rev. of: BEST, HARRY. The blind: their condition and the work being done for them in the United States. 20 × 15 cm., xxi + 763 p. Macmillan Co.: New York, 1919. (See Bot. Absts. 3, Entry 231.)] Jour. Heredity 10: 211. 1919.

216. ANONYMOUS. The genetics of the Bonavist bean. [Rev. of: HARLAND, S. C. Inheritance in *Dolichos lablab*, L. Part I. Jour. Genetics 10: 219-226. 1920. (See Bot. Absts. 7, Entry 1762.)] Gard. Chron. 69: 25. 1921.

217. ANONYMOUS. Rust resistance in wheat. [Rev. of: HAYES, H. K., JOHN H. PARKER, AND CARL KURTZWEL. Genetics of rust resistance in crosses of varieties of *Triticum vulgare* with varieties of *T. durum* and *T. dicoccum*. Jour. Agric. Res. 19: 523-542. 6 pl. 1920.] Gard. Chron. 68: 295. 1920.

218. ANONYMOUS. The vehicles of hereditary qualities. [Rev. of: MORGAN, T. H. The physical basis of heredity. 14 × 21 cm., 305 p., 117 fig. J. B. Lippincott Co.: Philadelphia and London, 1919. (See Bot. Absts. 4, Entry 422.)] Nature 106: 103-105. 1920.

219. ANTHONY, R. La pseudo-hermaphroditisme tubaire chez les Cétacés mâles. [Pseudo-hermaphroditism in the male Cetaceans.] Compt. Rend. Acad. Sci. Paris 171: 1398-1399. 1920.

220. ARPS, GEORGE F. Polydactylism and the phenomenon of regeneration. Jour. Amer. Med. Assoc. 74: 873-874. 1920.—Polydactylism is not uncommon in man and has been known since antiquity. In some places as at Eycaux, France, the trait has come to prevail in a community. In the present instance an Alabama negro soldier, 21 years old, was observed to have an extra finger on the ulnar margin of each hand. The subject, whose mental age is given as 10.3 years, reported that his father, brother, 5 sisters and 2 nieces all showed the same trait. He also affirmed that his father had the supernumerary digits removed, since which time it has "been necessary to trim them off, as they grow continuously." This (unverified) statement is advanced as evidence of regeneration.—C. H. Danforth.

221. BALLY, WALTER. Die Godronschen-Bastarde zwischen *Aegilops*- und *Triticum*-arten. Vererbung und Zytologie. [The Godronian hybrids between species of *Aegilops* and *Triticum*. Heredity and cytology.] Zeitschr. Indukt. Abstamm.- u. Vererb. 20: 177-240. 4 fig. 1919.—In 1854 GODRON in Montpellier reported on the F_1 of a hybrid, *Aegilops ovata* × *Triticum vulgare*. Later he reported that he had secured from a back-cross with wheat—the pollen parent of the hybrid—a fertile hybrid that remained constant and bred true in subsequent generations. This he called *Aegilops speltaeformis*. The author (Bally) pollinated 250 *A. ovata* flowers with *Triticum vulgare* pollen, and secured two F_1 hybrid plants. From 80 reciprocal pollinations he secured three F_1 hybrid plants. These hybrids are figured and described, the two lots of F_1 plants being similar. The pollen of the F_1 plants was sterile, being devoid of starch and otherwise not normally developed. Both wheat and *Aegilops* pollen also failed to fertilize the flowers of the F_1 plants. The cytological study revealed that *T. vulgare* has 8, *A. ovata* 16, haploid chromosomes. The number of haploid chromosomes in the F_1 hybrid of these can sometimes be determined as 12. When more than 12 appear this excess number can be explained as arising through somatic divisions of excess chromosomes of the *Aegilops* parent remaining unpaired in the diakinesis. The difference in form of the plump *Triticum* and the slender *Aegilops* chromosomes is again apparent in the reduction division of the hybrid. In the mitotic division single chromosomes arising from wheat can be recognized, and it can be shown that these in the course of meiosis can cause irregularities, and that single cells are separated which have the chromatin in their nuclei made up exclusively from that of a single parent. Another species of *Aegilops*, probably *ventricosa* (earlier thought to be *speltaeformis*) had 6 haploid chromosomes.—C. E. Leighty.

222. BANNIER, J. P. [Dutch rev. of: HAGEM, OSCAR. Einige F₂ und F₃ Generationen bei dem Bastard *Medicago sativa* × *M. falcata*. (Some F₂ and F₃ generations of the hybrid *Medicago sativa* × *M. falcata*.) *Nyt Mag. Naturvidenskab.* 56: 149-165. 1919.] *Genetica* 2: 535-536. 1920.

223. BANNIER, J. P. [Dutch rev. of: (1) YAMPOLSKY, CECIL. Inheritance of sex in *Mercurialis annua*. *Amer. Jour. Bot.* 6: 410-442. Pl. 37-40, 1 fig. 1919. (See Bot. Absts. 4, Entry 827.) (2). IDEM. The occurrence and inheritance of sex intergradation in plants. *Amer. Jour. Bot.* 7: 21-38. 1920. (See Bot. Absts. 5, Entry 502.) (3). IDEM. Sex intergradation in the flowers of *Mercurialis annua*. *Amer. Jour. Bot.* 7: 95-100. 1 pl. 1920. (4). IDEM. Further observations on sex in *Mercurialis annua*. *Amer. Nat.* 54: 280-284. 1 fig. 1920. (See Bot. Absts. 6, Entry 750.)] *Genetica* 2: 554-556. 1920.

224. BANTA, ARTHUR M. Selection in Cladocera. [Abstract.] *Anat. Rec.* 20: 212. 1921.—Some years ago the writer undertook experiments in selection in parthenogenetic pure lines of *Cladocera* on the basis of a purely physiological character, reactivity to light. Sixteen lines were subjected to selection for various periods extending over from 18 to 196 generations. In 7 of these lines no difference appeared in reactivity between the 2 strains of the same line. In 2 lines slight divergences in reactivity were in the reverse of selection. These divergences, while not large, were fairly consistent. In 1 of these cases the divergence decreased as the experiment progressed. In 5 lines there was a possible effect of selection but the evidence is not considered conclusive. In 2 lines an effect of selection is rather clearly indicated. In 1 of these the divergence was not large and this case may be disregarded. But in the other the effect of selection is very large and is clearly substantiated. The divergence in this line appeared slowly and increased gradually until during the last months of the experiment the reaction time of the low strain was less than a third that of the high strain. The difference in reactivity to light was permanent or at any rate persisted for 32 months (112 generations) after selection was discontinued. Return selection was not attempted.—A 2nd series of selection experiments based on an entirely different character is now under way. The character used is the degree of intergradedness of sex intergrade strains of *Daphnia longispina*. Derived from a common progenitor and reproducing solely by parthenogenesis this would seem a most excellent material for a study of selection. Three strains were selected as high strains and 3 as low strains, the high and low strains being taken alternately from the 6 available sister strains. Selection was effective in each case, the individuals of the high strains becoming as high (i.e., as male) as they could be maintained with fair reproductive ability; and the low strains approaching very nearly the condition in which sex intergradedness is not apparent, i.e., most of the individuals showed no sex intergrade characters and the few intergrades were slightly affected. While the facts are as stated, environmental or other factors are influential to such an extent that the curves for the different strains fluctuate somewhat. Further, selection is not effective with equal promptness in every strain though in all cases it has ultimately been effective. Return selection is also effective. Through selection low strains have been derived from the selected high strains, and high strains from the selected low strains. Two strains have in turn been selected low strains, selected high strains, and selected low strains again.—Thus selection and return selection are equally effective with the amount or degree of sex intergradedness in *Daphnia longispina*.—Arthur M. Banta.

225. BARTSCH, P. Experiments in the breeding of Cerions. *Carnegie Inst. Washington Publ.* 282. 55 p., 59 pl. Washington, 1920.—These land shells are extremely non-roving and are well adapted to breeding experiments in which isolation in different regions is a feature. Author planted four *Cerion* species from the Bahamas on the Florida keys. From several of the many colonies (usually containing 500 to several thousand marked shells) numerous first generation Florida-grown offspring have been obtained. In several cases lots of first generation offspring were transplanted and known second generation Florida-grown offspring secured. Differences in internal structural features in the different species

are pointed out and figured, but the characters utilized in comparing Florida-grown offspring with Bahama ancestry are shell characters. Differences in general coloration, mottling, and ridging of the shells are mentioned. The characters used as standards of comparison are numerical characters, numbers of whorls, altitude, and greatest diameter of the shell. A check series (100) of each of the species transplanted, and all the measured first and second generation Florida-grown offspring, are figured in plates and the individual measurements are all given in tables.—While in most of the series of first and second generation Florida-grown material one notes that the mean altitude is greater and the mean greatest diameter is less than in the original Bahama material, no great changes are seen in the means or in the ranges of variation of the characters studied. No biometrical treatment of data has been employed. The author concludes that the different species of *Cerion*s seem to be quite stable within their normal limits of variation and appear to adhere to these limits even when subjected to a decidedly changed environment.—Hybrids were obtained between transplanted Bahama *Cerion viaregis* and the native Florida-key *Cerion incanum*. In shell measurements the author finds the hybrids intermediate and somewhat more variable than the parent species. In coloration, character of ridging, and general shape of shell the hybrids are extremely variable. Some are so mottled as very strongly to resemble the mottled *Cerion martensi* group; in general character of ribbing the range was from the relatively smooth *Cerion incanum* to the rough *Cerion viaregis*; the range in general form was likewise from the somewhat cylindrical *Cerion incanum* to the more conical *Cerion viaregis*. What is of even greater interest, these variations are independently combined in the hybrid offspring. Attention is called to cases in which species in a certain region are sometimes found to be extremely variable. "Prior to this year I was more and more inclined to the belief that we might possibly find that these very abundant and variable forms might represent new ingressions into a faunal area in which conditions for their existence were optimum to an unusual degree, where the normal death rate, due possibly to an absence of natural enemies, might be reduced, and where all the factors involved were inclined to favor the new arrival to the utmost, and that these factors and the necessarily reduced inbreeding might be responsible for the loosening of specific bounds and the producing of variants which, in the course of time, might result in a state of flux.—"Our *Cerion* experiments on Newfound Harbor Key, however, throw a new light upon the case, for here we have produced a *state of flux* by cross-breeding. There is no question that if we did not know the true inwardness of the *Cerion* complex as it exists at the present time in our colony upon this key, we would treat the material as we have treated such assemblages in the past; that is, as a very variable species. It therefore seems proper to assume that the converse should receive an equally favorable consideration, for it seems fair to believe that further breeding experiments will prove that such complexes are the product of cross-breeding.—A. M. Banta.

226. BATESON, W. Genetic segregation. Proc. Roy. Soc. London B, 91: 358-368. 1920.—Segregation is a phenomenon which is not limited to particular classes or kinds of characters. The factors governing segregation of quantitative characters either do not segregate cleanly or the numbers involved are so large that their effects are not clearly shown. In many crosses involving quantitative characters, which appear to segregate cleanly, one or the other original type fails to reappear in its entirety. The author favors the first explanation suggested. Factor groups or complexes may sometimes segregate as units, sex determination and irregularities of inheritance in *Oenothera* are mentioned as being due to such a phenomenon. In other cases these complexes may break up and are then responsible for the appearance of mosaics of secondary sexual characters in fowls and different classes of color mosaics in the snapdragon and sweet pea. Linkage between factors conditioning the several character components of the mosaics is seldom evidenced and the question is raised if they are all distributed among different chromosomes. The author protests the general application of MORGAN's theory regarding crossing over and the limitation of linkage groups on the ground that it has been proven for only one case—*Drosophila*. The theory of linkage and crossing over has assumed much regarding the physical behavior of the chromosomes that cytology cannot substantiate. In plants the time of segregation is not limited to the reduc-

tion division as seems to be the case with animals. Cases are cited where the genetic constitutions of male and female cells of plants are so diverse that it cannot be accounted for by segregation during the reduction division. Cases of linkage values different for the male and female sex cells of the same plant are cited as exceptions to the ordinary mode of segregation. Evidence that somatic segregation may influence genetic potentialities is furnished by several citations in which root cuttings produce plants differing in some characters from the parent plant and from experiments upon rogues in peas. The author is led to believe that segregation of hereditary genes may occur at any division in the life cycle. [See also Bot. Absts. 8, Entry 214.]-*J. L. Collins.*

227. BENDERS. [Dutch rev. of: FLEISCHER, BRUNO, UND WILLIAM JOSENHANS. Ein Beitrag zur Frage der Vererbung der familiären Sehnerventrophie (Leberscher Krankheit). (Inheritance of familial atrophy of the optic nerve (Leber's disease).) Arch. Rass.- u. Gesellschaftsbiol. 13: 129-158. 5 pl. 1920.] *Genetica* 2: 532. 1920.

228. BENDERS. [Dutch rev. of: GROSS, K. Über Vererbung von Augen- und Haarfarbe und den Zusammenhang beider. (On inheritance of eye and hair color and the correlation between them.) Arch. Rass.- u. Gesellschaftsbiol. 13: 164-170. 1920. (See Bot. Absts. 8, Entry 266.)] *Genetica* 2: 534-535. 1920.

229. BLARINGHEM, L. Stabilité et fertilité de l'hybride *Geum urbanum* L. \times *G. rivale* L. [Stability and fertility of the hybrid *Geum urbanum* L. \times *G. rivale* L.] *Compt. Rend. Acad. Sci. Paris* 170: 1284-1286. 1920.—Author pollinated *Geum urbanum* with pollen of *G. rivale*, securing an F₁ generation of 3 uniform plants. These gave seed for an F₂ generation of over 100 plants, 41 of which were used as basis of author's account. He described F₂ group as uniform and lacking Mendelian segregation and considers this crossing as exemplifying his "*hérédité mixte*" (see Bot. Absts. 4, Entry 523). There was an average of about 25 per cent of imperfect pollen grains in F₂. Author considers this hybrid type as similar to *Geum intermedium* of taxonomists.—*James P. Kelly.*

230. BLISS, A. J. Mendelian characters in bearded Irises. *Jour. Roy. Hort. Soc.* 45: 289-292. 1919.—A record of several varieties of bearded *Iris* including combinations of *variegata* and *neglecta* types that tend to show that pigmented leaf base and brown-tipped beard are Mendelian in character, possibly single unit characters. Bliss finds, however, no apparent connection between these characters and color or type of flower. A cross of *variegata* by *amoena* gave no *squalens* colors and "it almost looks as if *amoena* and *variegata* were allelomorphic color varieties."—*J. Marion Skull.*

231. BONNEVIE. Arvelighetsundersökelse i en norsk bygdeslaegt (Polydaktyli Tvillingfödsler). [Investigations of inheritance in a Norwegian family pedigree (Polydactyly, birth of twins).] *Videnskabselskab. Kristiania Forhandl.* (1918). 1919.—A considerable number of individuals in southeastern Norway have six fingers on one or both hands, and often six toes on one or both feet. Sixth finger is on side of little finger. It appears to be a dominant character through successive generations. All go back to one man from Ringebu in Gudbrandsdal in middle of seventeenth century. Twins and triplets were numerous. Twin mothers in all cases known have both parents from lines of twin-producing families, that is, character appears to be recessive.—*A. Gundersen.*

232. BONNIER, GASTON. Sur les changements, obtenues expérimentalement, dans les forms végétales. [On the alterations obtained experimentally in the form of plants.] *Compt. Rend. Acad. Sci. Paris* 170: 1356-1359. 1920.—Observations on seventeen lowland species transplanted in same soil to high stations in the Alps and Pyrenees, which have come to resemble after period of 30 to 35 years typical alpine species of same genera. Particulars are given in each case. Author discusses briefly taxonomic problems raised by these results. He holds that facts favor Lamarckian hypothesis that environmental change is one of principal causes of transformation of organisms.—*R. E. Clausen.*

233. BRAINERD, EZRA, AND A. K. PEITERSEN. *Blackberries of New England. Their classification.* Vermont Agric. Exp. Sta. Bull. 217. 84 p., 36 pl. 1920.—A comprehensive report on the classification of the blackberries in which the authors conclude "that it is no longer a question of whether or not new species of blackberries are produced in the wild through natural hybridization but rather that it is a question whether hybridization is not the primary or only factor in the production of new species within this group." A more detailed discussion of the subject of spontaneous hybridization is to be published later but some of the more important facts are enumerated which have led to the conclusion that intercrossing of different species of blackberries is of common occurrence in the wild: 1. All New England forms show more or less infertility, none having been found 100 per cent fertile, while many almost sterile forms have been grown. This infertility is due largely to the impotence of the pollen.—2. Intermediate forms between all of the well recognized species exist in the wild.—3. Wherever an intermediate between any two forms of blackberries is found the two suspected parents usually can be located.—4. Plants of the blackberry sub-genus are very variable.—5. Seeds from selfed flowers of a number of suspected hybrids have been grown and these plants, in the majority of cases, show a reversion to the suppressed parent types.—6. A number of artificial crosses have been effected between different species. The plants from these crosses are almost identical with the suspected wild hybrids.—7. In more than 30 different combinations of New England blackberries that were cross-pollinated, not one failed to produce viable seed.—The authors point out that most of the characters which distinguish the different species of blackberries are quantitative, and the hybrids, therefore, nearly always show an intermediacy in the characters which are present in varying degrees in the parents. The offspring of such hybrids do not show segregation into dominants and recessives in the ordinary Mendelian ratios but all grades of intermediates are found. In some cases (*R. permixtus*, *R. frondisensis*, and *R. abbrevians* Blanchard) these hybrids appear to be more or less fixed.—J. H. Kempton.

234. BRIERLY, W. B. *Experimental studies in the specific value of morphological characters in the fungi.* Proc. Linnean Soc. London 1918: 55-56. 1918.—Pedigree cultures were made from single spores of *Botrytis*. The spore mode of a given culture from cabbage was found to be different when the organism was grown on tomato, and gave other modes for other substrata. A culture derived from onions when grown on cabbage differed in mode from that originating from cabbage. He concludes that the fungus consists of many elementary species or Jordanons which are morphologically distinct. He recognizes a "normal variation," present upon whatever host and characteristic of the elementary species, and a "modal" variation induced by the substratum. In nature the elementary species are usually on special hosts but saprophytically are of broad range. To determine an elementary species it is therefore necessary to isolate it and determine its "modal variation" on a series of standard media. Similar results and conclusions were had with *Penicillium* and *Stysanus*.—F. L. Stevens.

235. BROMAN, IVAR. *Das sogenannte biogenetische Grundgesetz und die moderne Erblichkeitslehre.* [The so-called biogenetic law and modern genetics.] Bergmann: München and Wiesbaden, 1920.

236. BUXTON, L. H. DUDLEY. *The inhabitants of the eastern Mediterranean.* Biometrika 13: 92-112. 1 pl. 1920.—The author deals with physical anthropology of ancient and modern Greeks, examining cephalic index, glabella-occipital length, greatest head breadth, upper facial index, nasal index, stature, and pigmentation. Significant difference in cephalic index between Lycian Greeks (80.27 ± 0.35) and those of Meligala in Messenia (82.49 ± 0.38), and of Cyprus (82.54 ± 0.11) are found; also between Cretans (79.26 ± 0.16) and Cypriots. High standard deviations indicate mixed population. Variability of Cretans dates from Middle Minoan times. Endogamous Lycian gypsies show standard deviation of cephalic index of only 2.83 ± 0.19 . There is no significant difference in coefficients of variation of head length and head breadth for the same group. For different districts head breadth is stable in Cyprus,

while head length is stable in Crete. For Crete stature of living adult males is 170.61 ± 0.26 cm. (175.26 ± 0.54 cm. for Selinos and Sphakia only); for Cyprus it is 168.77 ± 0.17 cm. Blue eyes are locally not uncommon, about 10 per cent in Albania and Cyprus, about 5 per cent in Crete. Pigmentation is apparently not definitely correlated with cephalic index. Lycian gypsies are only clear representatives of "Armenoid" race. Greeks are a mixture probably of early date of Mediterranean and Alpine types. No good ground appears for inferring Nordic blood.—*John Rice Miner.*

237. CARLE, E. Premiers travaux sur la sélection des riz du laboratoire d'étude des céréales à Saigon. [First work in selection of rice at the Saigon laboratory for the study of cereals.] Bull. Agric. Inst. Sci. Saigon 1: 74-87. 1919.—As preliminary work to the improvement of rice in Cochín-China, an agronomic study of 700-800 varieties of rice was made, resulting in the use of those varieties with more or less round kernels as better suited for the production of the finest rice. Selection from the second generation indicates a considerable improvement in the homogeneity of the grain; also a slight increase in the tillering capacity of the plants and in the weight of the grain. Certain strains also gave much greater yields than those used as checks, but in succeeding generations it was observed that this character was not constant. By comparing the yields of all strains in the preceding generations it seems possible in the third generation to classify those which appear most constant in heavy yield. In the fourth generation a certain number of choice strains can be isolated.—*Chas. R. Chambliss.*

238. CARLE, E. Sélection pédigrée appliquée à la variété local de riz Phung-tien. [Pedigree selection applied to the local rice variety known as Phung-tien.] Bull. Agric. Inst. Sci. Saigon 2: 26-32. 1920.—Pure line selections of rice variety Phung-tien made and tested at Experiment Station at Phu-my (Cochín-China). Five best lines selected from 100 grown during first year show greater uniformity and are otherwise superior to original variety. Data on number and weight of heads are presented.—*C. E. Leighty.*

239. CARLE, E. Sélection pédigrée appliquée à la variété de riz "Nàng-Mèo." [Pedigree selection applied to the variety of rice known as "Nàng Mèo."] Bull. Agric. Inst. Sci. Saigon 2: 73-75. 1920.—Improvement of rice variety "Nàng-Mèo" by selection is being attempted at Experimental Station at Phu-my (Cochín-China), according to methods described earlier in this bulletin (Vol. 1, 1920). Data on number and weight of heads of 4 lines for 3 years are presented. Nursery yields indicate commercial value of strains. Homogeneity of pure lines and characters differentiating them are noted.—*C. E. Leighty.*

240. COLLINS, E. J. The genetics of sex. Proc. Roy. Soc. London B, 91: 369-370. 1920.—Vegetative cultures from the monoecious moss, *Funaria hygrometrica*, made by removing the greater part of an archegonium, regenerated the typical monoecious gametophyte, unlike the vegetative cultures derived from antheridia and surrounding "perigonal leaves" of the same species which produce male plants only. Up to the point of the formation of the female organ, the cells of the haploid gametophytic phase retain the power to produce monoecious plants, whereas the leaves surrounding the male organ have lost this power.—*D. F. Jones.*

241. COLLINS, JULIUS L. Inbreeding and cross breeding in *Crepis capillaris* (L.) Wallr. Univ. California Publ. Agric. Sci. 2: 205-216. Pl. 39-41. 1920.—The naturally cross-fertilized wild plant, *Crepis capillaris*, when inbred, gives results similar to domesticated maize when so treated. The inbred plants compared with cross-bred ones show a slower rate of development during the entire period of growth. Some of the inbred strains exhibited partial pollen sterility. Complete absence of pollen was noted in one plant obtained from seed of wild plants growing in New Zealand. The maximum reduction appeared to be reached in the third and fourth generations. Inbred strains when crossed with non-inbred, produced vigorous, rapidly growing F_1 plants.—*D. F. Jones.*

242. CORRENS, C. Die Konkurrenz der männlichen und die weiblichen Keimzellen und das Zahlenverhältnis der beiden Geschlechter. [The concurrence of male and female germ-cells and the numerical relations of the two sexes.] *Naturwissenschaften* 6: 277-280. 1918.—The dioecious plant, *Melandrium*, when pollinated with a small amount of pollen gave a ratio of 737 pistillate to 555 staminate plants, and when a large amount of pollen was applied gave a ratio of 895 pistillate to 381 staminate. In the first case there were 43 per cent and in the second 30 per cent of staminate plants, showing that when the competition is keen the staminate-determining pollen nuclei are at a greater disadvantage, due to a slower growth of the pollen tubes carrying them. When the pollen is not in excess the slower-growing tubes have a better opportunity to fertilize, but even in those cases the sex ratio is not equal, a larger number of pistillate plants always resulting.—D. F. Jones.

243. CORRENS, C. Fortsetzung der Versuche zur experimentellen Verschiebung des Geschlechtsverhältnisses. [Continuation of experiments to shift the sex-ratio experimentally.] *Sitzungsber. Preuss. Akad. Wiss. Berlin* 1: 1175-1200. 3 fig. 1918.—In *Melandrium* there are ordinarily more female plants than male. The object of these experiments was to find means to alter the sex-ratio and thereby discover its determining factors. The method employed was that of varying the amount of pollen used in pollinations. There are about 350 ovules in an average capsule. When the amount of pollen applied is only slightly in excess of this number the resulting progeny shows an approximate equality of sexes (about 44 per cent males), but when a large excess (60,000 grains) is applied the proportion of males falls to about 32 per cent. This difference is about 8 times the probable error. The inference made is that there are two kinds of pollen—male-determining and female-determining—and that the second sort produces more active pollen tubes, which reach the ovules in advance of those of the male-determining sort. If a minimal amount of pollen is employed the female-producing tubes arrive first at the upper ovules and fertilize them leaving the slower male-determining ones to the lower ovules. Separating the seeds in the capsule into a lower and an upper portion confirmed this hypothesis by showing an excess of female plants from the upper seeds. It was also shown that female plants mature more quickly than males so that the proportion of males the first season was slightly lower than among the plants which lived over the winter and flowered the next season. Some experiments were also made showing that there is a differential mortality among pollen grains dried over sulphuric acid for 10 to 14 days. The male-determining appear to be weaker. Some apparently good seeds are always found incapable of further growth. Among seeds produced from old pollen this proportion is much larger, and in fact many of the embryos and ovules do not mature to the seed stage, dying at various stages.—Leonas L. Burlingame.

244. CORRENS, C. Zur Kenntnis einfacher mendelnder Bastarde. I. Die Unterscheidung der pilulifera-Homozygoten und der Heterozygoten des Bastardes *Urtica pilulifera* × *Dodartii*. II. *Mirabilis jalapa xantha* und ihre Bastarde. III. *Urtica urens peraeura*. [A contribution to the knowledge of simple Mendelian hybrids. I. Distinguishing the homozygote from the heterozygote of *Urtica pilulifera* × *Dodartii*. II. *Mirabilis jalapa xantha* and its hybrids. III. *Urtica urens peraeura*.] *Sitzungsber. Preuss. Akad. Wiss. Berlin* 1: 221-268. 1918.—Although the adult *pilulifera* homozygote and the hybrid are indistinguishable, as are also the cotyledon stages of the seedlings, yet the young plants can be distinguished by the character of the apices of the first 3 or 4 pairs of leaves. The tips of these first leaves show dominance of the *Dodartii* parent but in the later leaves the *pilulifera* parent appears to be completely dominant. As an explanation it is suggested that the *Dodartii* factor *D* becomes active earlier in ontogeny than the factor *P* which *pilulifera* has in addition to *D*, that is, *D* expresses itself only until *P* becomes active.—The *xantha* form of *Mirabilis jalapa* has only about 5 per cent as much chlorophyll as the normal (*typica*) form. *Chlorina* has about 30 per cent and *semichlorina* about 60 per cent of *typica*. *Variegata* has ground color of *chlorina* with full green flecks superposed. *Albomaculata* has leaves with white and green streaks and flecks. The amount of pigments was determined by comparison of crude alcoholic extracts of the same leaf area in some cases and of the same weight of leaves in others. *Chlorina* and *semichlorina*

show a proportional reduction of both chlorophyll and the yellow pigments. *Xantha* shows a slight increase of yellow with a large decrease of the green. *Xantha* survives only when grafted on green plants, when it sets seed. Various crosses were made with *typica*, *xantha*, and *chlorina*. The results are explicable on the assumptions: (1) That *xantha* possesses the factors ZZ for yellow pigments, (2) that *chlorina* has the formula ZZCCnn, and (3) that *typica* is NNCCZZ, where N is operative only when C is present. Four green genotypes, phenotypically alike, were identified as follows: (1) A type which when selfed gives 3 green to 1 *chlorina*, (2) a type which yields 9 *typica*: 3 *chlorina*: 4 *xantha*, (3) a type producing 3 *typica*: 1 *xantha*, and (4) homozygous *typica*. *Typica* × *chlorina* heterozygotes are only about 90 per cent as green as *typica* but heterozygotes of *typica* or *chlorina* with *xantha* are indistinguishable from the respective green homozygotes. *Urtica urens peraurea* is a yellow form which increases in green with age and is able to live independently. On account of its deficiency in chlorophyll it does not grow so rapidly nor to so great a size as the species. Selfing shows it to be a monohybrid which yields 2 greens to 1 *peraurea*. Satisfactory evidence has been secured to show that the 2:1 ratio arises through the failure of the yellow homozygote to live. A discussion is presented of the ratios to be expected in monohybrids when there is selective union of gametes, deficiency or excess of pollen, or inviable zygotic combinations.—*Leonas L. Burlingame*.

245. COULTER, MERLE C. Origin of mechanism of heredity. Bot. Gaz. 70: 459-464. 1920.—Author attempts to account for the evolutionary origin of the determiners (genes). He thinks they originated as by-products of metabolism. These by-products, he supposes, became isolated by anti-bodies and in later generations were released and induced the same kind of chemical changes as those of which they were the by-products.—*Edgar Altenburg*.

246. CROCKER, WM. Awn and barley yield. [Rev. of: HARLAN, H. V., AND S. ANTHONY. Development of barley kernels in normal and clipped spikes and the limitations of awnless and hooded varieties. Jour. Agric. Res. 19: 431-472. 1920. (See Bot. Absts. 6, Entry 1416.)] Bot. Gaz. 71: 77-78. 1921.

247. DANIEL, LUCIEN. Obtention d'une race nouvelle d'*Asphodelus* par l'action du climat marin. [The appearance of a new variety of *Asphodelus* through the effect of a marine climate.] Compt. Rend. Acad. Sci. Paris 170: 1332-1333. 1920.—*Asphodelus luteus* originally obtained from Rennes has become remarkably modified after 20 years at Erquy. New form divided vegetatively and taken back to Rennes retained its acquired characters in full. Parallel sowings of seed of two forms reproduced differences exhibited by parents. Experiments are being continued. Author considers observations particularly significant for question of inheritance of acquired characters.—*R. E. Clausen*.

248. DEHORNE, ARMAND. Spermatogénèse de *Corethra plumicornis* et chromosomes eupyrenes. [Spermatogenesis of *Corethra plumicornis* and eupyrene chromosomes.] Compt. Rend. Acad. Sci. Paris 171: 1399-1402. 1920.

249. DESMOULINS, A., ET V. VILLARD. The hybrid direct bearers in the valley of the Drome in 1919. Prog. Agric. et Vitic. (Ed. l'Est-Centre) 72: 62-65, 83-85, 114-116, 133-137. 1920.

250. DETLEFSEN, J. A. Genetic analysis of low crossover stock produced by selection. [Abstract.] Anat. Rec. 20: 211. 1921.—Following selection for low crossover values in red-eyed long-winged females (*Drosophila melanogaster*) heterozygous in white miniature, a stock was produced which has given crossover values of about 4-6 per cent for these 2 genes. The normal value used in plotting chromosome maps is 33 per cent. Matings of red long females from low crossover stock to white miniature males of normal stock gave F₁ females which show an intermediate value. When the F₁ sibs were mated inter se, the total F₂ results also showed an intermediate crossover value. However there was a distinct increase in the range of values.—Matings of red long males from low-crossover stock to eosin miniature females of normal stock gave similar results.—*J. A. Detlefsen*.

251. EAST, E. M. The rôle of reproduction in evolution. Amer. Nat. 52: 273-289. 1918.

—The rôle of methods of reproduction in evolution may be interpreted by comparing their effectiveness in offering selective agencies their raw material. Both asexual and sexual methods of reproduction occur in nearly all groups of animals and plants. In neither kingdom was sex developed as a more rapid means of multiplication; rather it fulfilled some other requirement. After origin of sex many changes in reproductive mechanisms occurred among plants, but almost all of them resulted in greater protection of the gametes, in increased assurance of fertilization, or in provision for better distribution, which may be interpreted as variations tending to perfect sexuality. Coincident with this, two important retrogressive developments occurred—apogamy and hermaphroditism—followed by evolution of methods of cross-fertilization, which seems to have been of immense advantage.—Essential evolutionary changes affecting reproduction in animals are strikingly similar to those in plants. Although asexual reproduction is found in most of the great groups of animals, it evidently did not meet all requirements since sexual reproduction is established in every phylum. Hermaphroditism is a secondary, not a primitive, phenomenon, and, as in plants, it was not found adequate. Further specialization resulted in mechanisms providing for mixtures of different germ-plasms.—Both animals and plants have adopted methods of reproduction which are identical in their essential features, something that can be said of no other life process. The significant feature is reduction of nuclear material in the gametes. This parallel evolution is of itself valid evidence of the importance of the process. For its interpretation compare sexual and asexual reproduction as an actual means for the transmission of characters. Extremely narrow variability of pedigreed inbred strains of *Nicotiana* and wheat indicate no higher heredity coefficient for sexual reproduction. Among animals it appears that the coefficient of heredity is as high for asexual as for sexual reproduction. But is this also true for germinal variation? It is believed the frequency of bud variations in higher plants propagated asexually shows that it is.—Even though there does not seem to be sufficient difference between sexual and asexual reproduction as regards variation frequency to make it a subject of experimental proof, certain theoretical points raise suspicion that there is such a difference. Parthenogenetic individuals having the haploid number of chromosomes should show proportionately more germinal variations than members of the same species having the diploid number of chromosomes, because both recessive and dominant variations should be recognizable in the former. That bud variations occur more frequently in heterozygotes than homozygotes means simply that bud variations are detected more frequently in heterozygotes because the majority of bud variations are retrogressive and therefore show only when the organism is heterozygous for the character affected.—The idea of MAUPAS, that continued asexual reproduction is impossible through some protoplasmic limitation, is rejected in favor of WEISMANN's conclusion, that a mixture of germ-plasms offers sufficient advantages to account for everything, which idea finds its main argument in Mendelian heredity. If N variations occur in the germ-plasm of an asexually reproducing organism only N types can be formed to offer raw material to selective agencies. But if N variations occur in the germ-plasm of a sexually reproducing organism 2^N types can be formed. The advantage is almost incalculable. These advantages remain even though it should be shown later that the more fundamental and generalized characters of an organism are not distributed by Mendelian heredity. The majority of variations seem to be comparatively small, changes in detail, the very kind known to be Mendelian in their inheritance. The prime reason for the success of sexual reproduction is the opportunity it gives for mingling germ-plasms of different constitution and thereby furnishing many times the quantity of raw material to selective agencies that could possibly be produced through asexual reproduction.—Minor advantages accruing from asexual reproduction are, first, heterosis or hybrid vigor, which is best explained on the basis of linked dominant characters. Second, division of labor is made possible by secondary sexual characters in general, including those which separate the egg and the sperm. Finally, there is a presumable advantage in sex-linked characters, a mechanism contributing to the mixing of germ-plasms.—The essential feature of the rôle of reproduction in evolution is the persistence of mechanisms in both the plant and animal kingdoms which offer selective agencies the greatest amount of raw material.—E. B. Babcock.

252. ELDERTON, ETHEL M. On the inheritance of the finger-print. *Biometrika* 13: 57-91. 1920.—Historical sketch of GALTON's collection of finger-prints from 2300 persons and treatment of the material. The "natural order" of variation is discussed and the series "arch, small loop, large loop, composite, whorl" is provisionally adopted for the present investigation.—The data are first treated from the "Mendelian standpoint" and the results considered "unsatisfactory." They are then discussed more at length from the "biometric standpoint," and 102 distribution tables, comprising various relationships from parents to cousins, are presented and correlations determined by the method of "mean square contingency." The conclusion is reached that "it is extremely probable that finger-prints are inherited at the same rate as other physical characters, but the type characteristic of any finger in the parent, while most likely to pass to the like finger in the offspring, may easily pass to the homologous finger of the other hand or indeed to any other finger whatever, of the offspring." Inexplicably low values are obtained for the resemblance in finger-prints between cousins. The larger part of the Galton data is restricted to "forefinger" prints and is, therefore, insufficient for more than indications of the direction of research. To the heavier task of collecting "complete sets of family finger-prints . . . the Galton Laboratory is now addressing itself."—Howard J. Banker.

253. ENGLEADOW, F. L. The inheritance of glume length and grain length in a wheat cross. *Jour. Genetics* 10: 109-134. 1 fig. 1920.—Results of a wheat cross between Polish (*Triticum polonicum* L.) and Kubanka (a variety of *T. durum* Desf.). Glume length and kernel length were studied. Glumes and kernels of Polish (P) were long while those of Kubanka (K) were short. F_1 was intermediate; F_2 gave no plants with as long glumes as Polish and none as short as Kubanka, that is, there was a "shift" toward a shorter Polonicum form and a longer Kubanka type. It was possible to distinguish the parental forms and they are found to follow the ratio of 1 long : 2 intermediates : 1 short. Grain length was also studied and behaved in a manner similar to glume length, and author concludes:—"(1) The one factor which governs the P - K glume difference also governs the P - K grain difference. (2) 'Shift' occurs, so that the P and K types as seen in F_2 (glume and grain) are numerically 'shifted' forms of the true F_0 type. The shifted values persist in F_3 . (3) In spite of the demands of the 'double-fertilization' theory, the grain appears, in so far as its length is concerned, to belong to the same generation as the plant on which it is borne, i.e., grain length is a maternal character and segregates on the 1 : 2 : 1 basis in F_2 ." And further that one factor controls: "(1) length of glume, (2) ribs on main lamina of glume, (3) shape of tip of glume, (4) curvature of keel of glume, (5) consistency of material of glume (P is 'papery,' K is more rigid), (6) length of grain, (7) shape and size of cross-section of grain, (8) the angle at which the embryo of the grain is set into the endosperm, (9) number and length of the hairs at the apex of the grain, (10) distinctness of the outline of the apical pad of the grain ('Gipfel-polster'—Kcke)." There is some relation between glume length and pubescence of the glume. The heavily pubescent types are also short-glume types.—It was considered that grain length is a maternal character although it is difficult to harmonize this with the double-fertilization hypothesis. Inheritance of hollow and solid straw seems complicated and it is indicated that there may be some relation between the glume-length inheritance and kind of straw.—H. H. Love.

254. FEDERLEY, HARRY. Beiträge zur Kenntnis der Säugetiergametogenese I. Die Spermatogenese von *Mus silvaticus* L. [Contribution to our knowledge of mammalian gametogenesis. I. The spermatogenesis of *Mus silvaticus* L.] *Acta Soc. Sci. Fennicae* 48: 5-37. 1 pl. 1919.

255. FIGINI, GUIDO. Intorno un cas di disgiunzione pigmentale in una infiorescenza di "*Antirrhinum majus*" L. [A case of pigmental disjunction in an inflorescence of *Antirrhinum majus* L.] *Riv. Biol.* 2: 3-5. 1920.

256. FRIMMEL, F. Notiz über Dominanzverhältnisse bei Fuchsienbastarden. [Note on dominance relations in *Fuchsia* hybrids.] *Zeitschr. Indukt. Abstamm.- u. Vererb.* 24: 279-281. 1920.

257. FRUWIRTH, C. Wicke mit linsenförmigen Samen. [Vetches with lens-shaped seeds.] Zeitschr. Pflanzenzücht. 7: 356-362. 1 fig. 1920.
258. GALIPPE, V. Nouvelles recherches sur la présence d'organismes vivants dans les cellules des glandes génitales mâles (microbiose, parasitisme normal ou accidentel). [New studies on the presence of living organisms in the cells of the male genital glands (microbiosis, normal or accidental parasitism).] Compt. Rend. Acad. Sci. Paris 169: 255-258. 1919.
259. GERBAULT, E. L. Hérités chez la Cymbalaire (première contribution). [Heredity in *Linaria cymbalaria*. First contribution.] Bull. Soc. Linn. Normandie VII, 2: 111-116. 1919.
260. GLASER, OTTO. Fertilization and egg-secretions. [Abstract.] Anat. Rec. 20: 227-228. 1921.—1. Egg secretions have been known for some time from the eggs of at least 10 species of echinoderms, 2 of annelids, 2 of tunicates, and 1 of molluscs. To this list another mollusc, the oyster, and 2 vertebrates, the fish, *Fundulus heteroclitus*, and the frog, *Rana pipiens*, are added by the author.—2. The importance of these secretions in the initiation of development has been demonstrated by a variety of methods. One of these, that of washing the eggs, has been criticized because in the 18-36 hours required to remove all traces of their exudates the eggs themselves may undergo serious deteriorations of other sorts. By using running sea water, the author has succeeded in shortening this period to 3 or 4 hours, and by removing their jelly and exposing the eggs to charcoal, he has succeeded in sterilizing them completely in 30 minutes.—3. The secretions agglutinate spermatozoa and initiate development. These effects are due, not to 1 substance with 2 side-chains, as postulated in the Fertilizin Theory, but to 2 chemical entities, the lipolysin on the one hand, and the agglutinin, on the other.—4. The lipolysin is a lipolytic ferment and catalyses the hydrolysis of the esters of the lower as well as the higher fatty acids. It may be that more than 1 ferment is involved.—5. The agglutinin very possibly is also a ferment, but the process which it catalyses has not yet been found.—5. A study of the specificities of fertilization must take account of the lipolysin and of the agglutinin. With respect to the former, it is possible to employ lipolysins derived from the eggs of *Arbacia*, *Asterias*, and of the oyster, for the purpose of increasing the fertility of *Echinarachnius* eggs partially sterilized by the removal of their own secretions; with respect to the agglutinin, it is possible to increase very greatly the success of crosses between *Echinarachnius parma* and *Arbacia punctulata*, if one kind or the other of their sex cells, but especially the spermatozoa, is treated with species-true egg secretion prior to insemination. It appears therefore that the agglutination reaction involves specific features because species-true agglutinin has effects quantitatively and perhaps qualitatively different from those of heterogeneous agglutinins.—Whatever transformations views on the initiation of development may undergo within the next few years, the zone within which an understanding must be sought is now marked off by the reaction capacities of perfectly definite physiological compounds.—Otto Glaser.
261. GOLDSCHMIDT, R. Einführung in die Vererbungswissenschaft. Zwanzig Vorlesungen für Studierende, Aerzte, Züchter. Dritte neubearbeitete Auflage. [Introduction to the science of genetics. 20 lectures for students, physicians, breeders. 3rd revised edition.] 519 p., 178 fig. W. Engelmann: Leipzig, 1920.—See Bot. Absts. 8, Entry 336.
262. GOLDSCHMIDT, R. Der Mendelismus in elementarer Darstellung. [Elementary presentation of Mendelism.] 77 p., 15 fig. P. Parey: Berlin, 1920.—See Bot. Absts. 8, Entry 335.
263. GOLDSCHMIDT, RICHARD. Untersuchungen zur Entwicklungsphysiologie des Flügel-musters der Schmetterlinge. I. Mitteilung. Einige Vorstudien. [Investigations on the physiology of development of the color pattern of the wings in butterflies. I. Some preliminary studies.] Arch. Entwicklungsmech. 47: 1-24. 12 fig. 1920.

264. GOWEN, JOHN W. Studies in milk secretion. VIII. On the influence of age on milk yield and butter-fat percentage as determined from the 365-day records of Holstein-Friesian cattle. Maine Agric. Exp. Sta. Bull. 293. 185-196. 1920.—Author gives results of study of relation of age to milk yield and percentage of butter-fat, by which it is shown that yield of milk rises at an ever-decreasing rate until the age of 8½ years, and then declines at an ever-increasing rate as age increases. Curves to fit the means of milk yield and butter-fat percentage are calculated.—*E. Roberts.*

265. GRAVES, R. R. A study of Guernsey breeding. Hoard's Dairyman 59: 1068, 1069, 1072. 1 fig. 1920.—Guernsey sires (166) were divided into 3 classes on basis of sires of production, sires of breeding daughters, and sires of breeding sons. These were traced back to foundation sires and numbers noted. 68.7 per cent of sires were produced by out-crossing, 19.3 per cent by line breeding, and 12 per cent by inbreeding. An attempt is being made to study inheritance of milk and fat. Relation of chromosome theory to facts observed in breeding dairy cattle is pointed out. No case of complete prepotency for production either in Guernsey or Holstein-Friesian breed was found. Variability in production of daughters, and its relation to judging quality of sire is considered.—*E. Roberts.*

266. GROSS, K. Über Vererbung von Augen- und Haarfarbe und den Zusammenhang beider. [On inheritance of eye and hair color and the correlation between them.] Arch. Rass.- u. Gesellschaftsbiol. 13: 164-170. 1920.—On the basis of a pedigree consisting of 4 grandparents, 5 each of the paternal and maternal fraternities, and 5 children the author proposes an hypothesis to account (1) for a brown-eyed child from two blue-eyed parents and (2) the association of blue eyes and brown hair and brown eyes and blonde hair as well as the more usual associations. There are: *P*, a ground-factor for iris pigmentation; *D*, a ground-factor for hair pigmentation; and *F*, an activating factor which affects pigment formation both in iris and hair. The application of this hypothesis to the family in question explains satisfactorily all of the observed combinations and distributions of eye and hair coloration.—[See also Bot. Absts. 8, Entry 228.]—*C. B. Davenport.*

267. GUYER, M. F., AND E. A. SMITH. Experiments with typhoid agglutinins in rabbits. [Abstract.] Anat. Rec. 20: 214. 1921.—Experiments are being conducted to determine whether immunization against germs of disease, practised generation after generation, will eventually result in a truly hereditary immunity. Rabbits may readily be sensitized with typhoid vaccine followed by the living bacteria so that their blood-serum diluted 320 to 640 times will agglutinate living typhoid bacilli. Females so sensitized may transmit to their young and even to their grand-descendants the ability to agglutinate typhoid bacilli in serum diluted from 60 to 160 times.—After 2 or 3 months of development the young of sensitized mothers are likely to show what appears to be a spontaneous rise of titre. If, for example, they have been averaging a titre of 80 for some time, it may rise to 120 or even 160. After a few weeks it drops back again. Rise of titre may be produced by the injection of milk into the blood-stream.—Young from a sensitized mother, when nursed by a normal mother, retain a fairly high titre for several months and may even show the spontaneous rise of titre mentioned. Young of a normal mother, when nursed by a sensitized mother, acquire a fairly high titre, presumably from the milk of the foster-mother, but lose it rapidly after weaning time.—*M. F. Guyer and E. A. Smith.*

268. HAGEM, OSCAR. Einige F_2 und F_3 Generationen bei dem Bastard *Medicago sativa* × *M. falcata*. [Some F_2 and F_3 generations of the hybrid *Medicago sativa* × *M. falcata*.] Nyt Mag. Naturvidenskab. 56: 149-165. 1919.—See Bot. Absts. 8, Entry 222.

269. HANSEN, W. Gedanken über Organisation und Arbeitersparnis in der Pflanzenzucht. [Thoughts on organization and labor saving in plant breeding.] Deutsch. Landw. Presse 1918: 261-262. 1918.—Author thinks that brief employment of young people does not further breeding industry, that use of the professor as superintendent deprives leaders in general of his knowledge which could be made available at breeding institutions, that the manag-

ing side should not become too extensive, that follow-up improvements be accompanied by reward of original breeder, that selections can often be reasonably limited and that a general testing of strains by public institutions is needed. [From anonymous review in *Zeitschr. Pflanzenzücht.* 6: 189. Dec., 1918.]—James P. Kelly.

270. HARLAN, HARRY V., AND H. K. HAYES. Occurrence of the fixed intermediate, *Hordeum intermedium* Haxtoni, in crosses between *H. vulgare pallidum* and *H. distichon palmella*. *Jour. Agric. Res.* 19: 575-591. 4 pl. 1920.—A barley, *Hordeum intermedium* Haxtoni, intermediate between typical 6-rowed and typical 2-rowed, has been known for many years and reported in literature as breeding true. Observations made since 1900 throw doubt on validity of fixed intermediates which bear lateral, fertile, unawned florets.—Authors crossed Manchuria and Svanhals varieties. Manchuria is typical 6-rowed and Svanhals has long-awned, central, fertile florets, and awnless, sterile, lateral ones. F_2 plants (87) produced F_3 families which were classified into 7 groups: (1) 22 plants, typical (phenotypic) 6-rowed; (2) 7 plants, lateral florets short-awned, highly fertile; (3) 25 plants, lateral florets awns short to pointed, fertility low; (4) 10 plants, lateral florets awns short to pointed, fertility nil; (5) 7 plants, lateral florets large, awnless, fertility low; (6) 11 plants, lateral florets awnless, fertility nil; (7) 5 plants, lateral florets small, awnless, fertility nil. Assuming a 2-factor hypothesis the following genetic analysis developed with the expected number of plants as indicated: (1) 22 plants homozygous for 6-rowed, $AABB$, heterozygous for 6-rowed \times regressive 6-rowed, $AABb$, and homozygous for regressive 6-rowed, $AAbb$; (2) 11 plants heterozygous for 6-rowed \times *intermedium*, $AaBB$; (3) 22 plants heterozygous for 6-rowed \times 2-rowed, $AaBb$; (4) 11 plants heterozygous for regressive 6-rowed \times 2-rowed, $Aabb$; (5) 5 plants homozygous for *intermedium*, $aaBB$; (6) 11 plants heterozygous for *intermedium* \times 2-rowed, $aaBb$; (7) 5 homozygous for 2-rowed, $aabb$. The 2 groups of 7 sub-groups correspond very well. The first sub-group in above groups is genetically complex. Factor AA is considered epistatic to BB and so all plants of group 1 are phenotypically identical. Evidence of presence of a third factor governing fertility is presented. Stability of *intermedium* form has been fully confirmed.—L. R. Waldron.

271. HERWERDEN, M. A. VAN. [Dutch rev. of: BROMAN, IVAR. Das sogenannte biogenetische Grundgesetz und die moderne Erblchkeitslehre. (The so-called biogenetic law and modern genetics.) Bergmann: München and Wiesbaden, 1920.] *Genetica* 2: 529-530. 1920.

272. HERWERDEN, M. A. VAN. [Dutch rev. of: MORGAN, THOMAS HUNT. The physical basis of heredity. 14×21 cm., 300 p., 117 fig. J. B. Lippincott Co.: Philadelphia, 1919. (See Bot. Absts. 5, Entry 422.)] *Genetica* 2: 542-544. 1920.

273. HOGBEN, LANCELOT. The problem of synopsis. *Jour. Roy. Microsc. Soc.* 1920: 269-276. Sept., 1920.—A brief critical review of recent work on the chromosomes. The important point is made that there is not yet agreement concerning the origin of the chromosomes pairing in synopsis nor in the method of pairing. The author thinks that, in view of the uncertainty, emphasized by Miss DIGBY's recent papers, concerning the question whether the chromosomes that pair in the heterotypic prophase are homologous paternal and maternal chromosomes respectively or whether they represent only the daughter halves of a single somatic chromosome which splits in the telophase of the last sporogenous cell (DIGBY), "Such an attempt to provide an interpretation of partial linkage in Mendelian inheritance is exceedingly ambitious" on the basis of the chiasmotype theory of crossing over. The gist of the paper is contained in the conclusion that "While the chromosome hypothesis has proved a great incentive to research—particularly in the problem of sex—its major premise, the reality of synopsis, is in no way firmly established; further knowledge of the relation of chromosomes to the organization of the resting nucleus and a specialized study of individual heterotype chromosomes constitute, therefore, two of the most imperative needs of cytological theory today."—Leonas L. Burlingame.

274. HROMÁDKO, J. Die Variabilität der Nachkommenschaft derselben Futterrübenmutter in der 1. Generation. [The variability of progenies of single mother beets in the first generation.] Zeitschr. Zuckerindust. Böhmen 42: 581-601. 1918.—Author presents data on progeny of a single pedigree mother beet (fodder type) that had been isolated in gauze, and compares them with similar observations of ANDRLIK and URBAN on sugar beet. For fodder-beets coefficients of variability for weight of root, weight of foliage, dry substance of root, and sugar content were respectively 39.7, 35.0, 9.57, and 16.31. In case of sugar-beet the corresponding characteristics gave coefficients of variability, respectively, of 28.46, 32.4, 6.88, and 6.02. Author attributes greater variability of sugar content in former to fact that selection for that is much more recent. [From anonymous review in Zeitschr. Pflanzenzücht. 6: 189-190. Dec., 1918.]—James P. Kelly.

275. HUXLEY, JULIAN S. Note on an alternating preponderance of males and females in fish, and its possible significance. Jour. Genetics 10: 265-276. 1920.—In a stock of fish (*Girardinus poecilooides*), according to records of E. G. BOULENGER, the ratio of females to males for nearly a year was 3:1. Later, this ratio among the young produced changed to 2♀:3♂ for a few weeks, after which the numbers of the two sexes became approximately equal and remained so for several years. On the basis of this case and data from other sources, Huxley argues that the most probable explanation is to assume (1) that the male in this fish is the heterozygous sex having formula XY, the female being XX; (2) that a certain proportion of the individuals of genetic composition XY became *somatic* females (= feminized males), owing to the action of some unknown environmental influence; (3) that such "somatic" females produced X and Y eggs, which, by fertilization with X and Y spermatozoa, gave rise in the next generation to a preponderance of males (XY), the YY zygotes being assumed to be non-viable.—F. B. Sumner.

276. IRELAND, ALLEYNE. Democracy and heredity—a reply. Jour. Heredity 10: 360-367. 1919.—A brief summary of an article by the writer (Democracy and the accepted facts of heredity. Jour. Heredity 9: 339-342. 1918) is followed by a discussion of criticisms offered by EDWIN G. CONKLIN, MADISON GRANT, PRESCOTT F. HALL, O. F. COOK, and ROBERT CARTER COOK (see May and June, 1919, issues of Jour. Heredity). Author's attitude was that "with few exceptions, the best governed countries were those in which the mass of people had the least control over the administration of public affairs." His "dissent from the conventional view of democracy . . . as a sound, political principle was based upon four main considerations: (a) That the individual and not the mass has been the main source of human advancement; (b) that mental and moral traits in the individual are derived chiefly from heredity and not from environment; (c) that acquired characteristics are not inheritable;" and (d) that assortative mating, encouraged in a democracy, tends to drain the lower classes of talent and genius and increase these qualities in the upper classes. Discussing the criticisms he continues: "the real issue, when stripped of all dialectical trappings, is whether good government depends ultimately upon good human qualities or upon good political machinery. If it depends chiefly upon the former," as author seems to believe, "all discussions of government must be founded in biology." In defense of his postulate of assortative mating he presents data from the works of HAVELOCK ELLIS and FREDERICK ADAMS WOODS which show "that over a period of several centuries there has occurred a striking and progressive decline in the cultural contribution from the 'lower' classes" in the face of increasing democratic opportunity. He closes his discussion by a brief comparison of social conditions under several forms of government which is unfavorable to the democracy, and emphasizes the importance of drawing a distinction between "administration" and "policy."—Howard J. Banker.

277. KAPPERT, H. Untersuchungen über den Merkmalskomplex glatte-runzlige Samenoberfläche bei der Erbse. [Studies on the character-complex smooth-wrinkled surface of peas.] Zeitschr. Indukt. Abstamm.- u. Vererb. 24: 185-210. 5 fig. 1920.

278. KATHARINER, L. Die Entwicklungsgeschichte der digenetischen Trematoden und die Kontinuität des Keimplasmas. [The ontogeny of the digenetic trematodes and the continuity of the germplasm.] Zool. Anzeig. 51: 220-223. 1920.—Reiteration of view that sporocyst, redia, and cercaria are not individuals of distinct generations, but that all have been produced from cleavage cells of same fertilized egg. Life cycle does not therefore involve parthenogenesis nor true paedogenesis.—A. Franklin Shull.

279. KOHN, ALFRED. Der Bauplan der Keimdrüsen. [The structural plan of germ-glands.] Arch. Entwicklungsmech. 47: 95-118. 7 fig. 1920.

280. KOTOWSKI, FELIKS. Zmniejszenie i Korrelacje w "czystej linii" pszenicy. Tr. vulgare Ostaka biala dublńska. [Correlation and variability in a pure line of wheat.] Polinusch: Tygodnika Rolniczy, Krakau, 1919.—Biometrical studies on 387 wheat plants. Coefficient of variability ranged from 7.06 per cent for length of stem to 43.07 per cent for weight of upper 20 cm. of stem in distributions that were found to be according to QUETELET's law. Correlation between stem length and weight of ear was only 0.20 ± 0.094 and author attributes little breeding value to stem length. Selection made with respect to weight of lower part of stem considered good. Correlation between ear weight and weight of lowest 20 cm. of stem was 0.75 ± 0.043 . Author does not ignore value of direct field selection in respect to non-lodging characteristic. [From anonymous German review in Zeitschr. Pflanzenzücht. 7: 333-334. Nov., 1920.]—James P. Kelly.

281. KRAFFKA, JOSEPH, JR. Environmental factors other than temperature affecting facet number in the bar-eyed mutant of *Drosophila*. Jour. Gen. Physiol. 3: 207-210. 1920.—Following the author's previous work with temperature in producing a change in facet number of the ultra-bar mutant of *Drosophila melanogaster* various tests were made to determine the effect of other environmental factors. Certain consistent and apparently significant changes in facet number were obtained but they were of slight amount. Provided a consistent procedure is followed and plenty of moist food available, temperature seems to be the only environmental factor which need be considered in interpreting breeding data in *Drosophila*.—H. H. Plough.

282. KRAFFKA, JOSEPH, JR. The post-embryonic development of the compound eye of *Drosophila melanogaster*. [Abstract.] Anat. Rec. 20: 231. 1921.—A histological study has been made of the development of the compound eye of *Drosophila melanogaster* Meig. The embryoblasts are present at the time of hatching, although the ommatidia are not completely metamorphosed until the late pupal period. The segmented condition of the optic ganglion, before definitive visual structures appear, suggests that the formation of the latter may be under the control of the nervous system. A marked reduction in the size of the optic ganglion in the bar-eyed mutant shows that the hereditary factor involves more than the facet number.—Joseph Kraffka, Jr.

283. KRÜGER, PAUL. Studien an Cirripeden. [Studies on Cirripedes.] Zeitschr. Indukt. Abstamm.- u. Vererb. 24: 105-108. 13 fig. 1920.

284. KÜSTER, E. Beiträge zur Kenntnis der panaschierten Laubgehölze. [Variegation in broad-leaved trees.] Mitteil. Deutsch. Dendrolog. Ges. 23: 85-88. 8 fig. 1919.

285. LANCEFIELD, D. E. Two sex-linked lethals of simultaneous appearance in *Drosophila obscura*. Proc. Soc. Exp. Biol. Med. 17: 56-57. 1919.—Genetic data in *Drosophila obscura* indicate the simultaneous appearance of 2 sex-linked lethal factors in the same culture. Breeding tests show that these 2 factors are apparently located at opposite ends of a sex chromosome longer than that of *Drosophila melanogaster*.—H. H. Plough.

286. LAUGHLIN, HARRY H. Illustrating the structure and mathematics of the human germ-plasm. Jour. Heredity 11: 185-189. 1 fig. 1920.—A figure and description of "an abacus"

consisting of a board with 2 rows of independently revolving spools, suitably labelled, by which the various combinations of genes in two paired chromosomes may be illustrated.—*H. J. Banker.*

287. LA VAULX, R. DE. L'intersexualité chez un Crustacé Cladocère: *Daphne Atkinsoni* Baird. [Intersexuality in a crustacean Cladocera, *Daphne Atkinsoni* Baird. Compt. Rend. Acad. Sci. Paris 169: 97-99. July, 1919.

288. LILLIE, FRANK R. The initial event in fertilization. [Abstract.] Anat. Rec. 20: 225. 1921.—The initial event in fertilization has a primary significance because all others depend for their occurrence upon it and for their degree of efficiency upon its quantitative value. The initial event also displays a high degree of simplicity in relation to subsequent events.—Two new methods of study are applied in this paper to its study: First, the effect of copper salts upon the fertilization reaction; second, a comparison of the relative degrees of specificity between sperm agglutination by egg secretions and the fertilization reaction itself.—Copper has an incomparably greater effect on the initial reaction in fertilization than on later stages of *Arbacia*. It may therefore be used for an analysis of this reaction. The results indicate the presence of a copper-avid substance in the cortex of the egg that is responsible for activation.—The specificity of sperm agglutination by egg secretions between 2 species of *Strongylocentrotus* is found to be of the same order as fertilization specificity.—The copper-avid substance of the cortex of the egg is to be identified with the sperm-agglutinating substance of egg secretion and with the fertilizin of previous papers.—*Frank R. Lillie.*

289. LOTSY, J. P. Eenige resultaten van het Oenotherajaar 1920. [Some results of the *Oenothera* year 1920.] Genetica 2: 481-528. 57 fig. 1920.

290. LOTSY, J. P. [Dutch rev. of: HONING, J. A. Erfelijkheidsleer zonder Evolutie theoriën. Rede uitgesproken bij de aanvaarding van het Hoogleeraarsambt aan de Landbouwhoogeschool te Wageningen 23 Nov. 1920. [Genetics vs. theories of evolution. Lecture given on assuming the office of Professor at the Agricultural School of Wageningen Nov. 23, 1920. H. Veenman: Wageningen, 1920.] Genetica 2: 536-537. 1920.

291. LOTSY, J. P. [Dutch rev. of: TÄCKHOLM, G. On the cytology of the genus *Rosa*. A preliminary note. Svensk Bot. Tidskr. 14: 300-311. 3 fig. 1920. (See Bot. Absts. 7, Entry 243.)] Genetica 2: 547-554. 1920.

292. McCLEUNG, C. E. The chromosomes in fertilization. [Abstract.] Anat. Rec. 20: 228-229. 1921.—1. The process of fertilization consists essentially in the introduction into the egg of a simplex series of chromosomes, duplicating the series left there by oogenesis. Little or no other material is carried by the spermatozoön.—2. Since genetic experiments indicate the equivalence of male and female in heredity, the importance of the chromatin is demonstrated.—3. Behavior of characters in inheritance, indicating factor differences and groupings, are paralleled by conditions of structure and behavior of the chromosomes.—4. The chromosomes introduced by the spermatozoön are reduced to the smallest volume and contain chromatin in the most condensed condition.—5. The chromatin quickly absorbs fluid from the egg cytoplasm and forms a nuclear vesicle in which the chromosomes later appear in the size, form, and number that marked them in the spermatid.—6. Upon union of the egg and sperm pronuclei the paternal chromosomes may remain distinctly grouped and this segregation may be followed through many generations of cells.—7. The individual paternal chromosomes may be traced into the body cells of the embryo and are found later in the germ cells.—8. During the many generations between the ovum and the adult organism in which maturation occurs, the chromosomes have reproduced themselves, each time under different conditions in the organization and constitution of the body, so that in the germ cells they must emerge somewhat different in character from what they were on entering.—9. At the period of maturation in the germ cells, however, the homologous elements from the two

parents unite in the most intimate manner but without the loss of their individual identity, thus completing the process of union inaugurated by fertilization.—10. Still, distinguished by characteristics of form, size and behavior, they are then segregated by chance and distributed again into mature germ cells in a simplex series. Through these they may be traced again into another generation of organisms where they repeat the series of processes.—11. Fertilization, although not necessary to reproduction, and omitted in parthenogenesis, is required in biparental inheritance and there serves the essential purpose of introducing the necessary duplicate control factors—the chromosomes.—*C. E. McClung.*

293. MACCURDY, M. Conjugation and fission-rate in *Arcella vulgaris* (Ehrenberg). [Abstract.] *Anat. Rec.* 20: 199. 1921.—In pedigreed cultures of *Arcella vulgaris* under laboratory conditions the fission rate varies considerably. A general average rate in a non-conjugating line derived from 1 parent cell was 1 division for every 2.56 days. At times when estimated for weekly periods, the fission rate for any one line would increase for a period giving a higher rate and this would be followed by a period of slower divisions. The rate in a parallel line might not be the same.—Conjugation was most often found to occur at times of low fission rate. In many cases this was found to occur at intervals of about a month. There are exceptions. Many ex-conjugants gave a higher rate of division for a period following conjugation than parallel lines gave for the same period. Some non-conjugants gave a higher rate than some ex-conjugants. Certain nuclear conditions are pointed out and their probable significance considered.—*M. MacCurdy.*

294. MACOUN, W. T. Apple breeding in Canada. *Proc. Amer. Pomol. Soc.* 1917: 11-27. 1 pl., 1 fig. 1918. [See *Bot. Absts.* 7, Entry 985.]

295. MALAQUIN, A. Reproduction sexuée et reproduction asexuée. [Sexual and asexual reproduction.] *Compt. Rend. Acad. Sci. Paris* 171: 1403-1406. 1920.

296. MARCHAL, E. Recherches sur les variations numériques des chromosomes dans la série végétale. [Studies on the numerical variations of the chromosomes in plants.] *Mem. Acad. Roy. Belgique Cl. Sci.* 4: 1-198. [Year?]

297. MASSART, J. La notion de l'espèce en biologie. [The notion of species in biology.] *Bull. Cl. Sci. Acad. Roy. Belgique* 1920: 366-381. 4 fig. 1920.—The classic definition of species according to the author, does not correspond to the Linnean species, nor even to the Jordanian species, but to the line.—A good example of the line is furnished by *Quercus ilex*. The nuts of a tree are similar. They often differ from one tree to another, but often a little group has the same type of nuts. Each tree gives every year the same form of nuts. The young plants show that the nuts of a single tree are similar, but they differ from those of another individual. Each tree has in the young stage more spiny leaves. There are many other examples of stable lines in wild species. In the definition of the line, it is necessary to include neither self-fertilization nor homozygous. In fact, some self-sterile lines (*Lolium perenne*), and some heterozygous lines (*Primula insecta*) are known. The taxonomist and the biogeographer should content themselves provisionally with Linnean and Jordanian species. The lines have three origins: Hybridization, generative mutation, and vegetative mutation.—*Henri Micheels.* (Translated by *Geo. H. Shull.*)

298. MATHEWS, J. WRENFORD. Sheep and wool for farmers. Cross-breeding experiments. Results of lamb-raising trials. *Agric. Gaz. New South Wales* 31: 761-770, 846-852. 10 fig. 1920.

299. MEVES, FRIEDRICH. Eine neue Stütze für die Plastosomentheorie der Vererbung. [A new support for the plastosome theory of heredity.] *Anat. Anzeig.* 50: 551-557. 2 fig. April, 1918.—Author offers evidence, based upon studies of fertilization of egg of nematode *Oxyuris*, that plastosomes or "plastochondria" are introduced into egg by spermatozoon; and that they, together with similar bodies from egg, are portioned out to first two daughter cells of zygote, and presumably play a part in heredity as well as the nuclei.—*F. B. Sumner.*

300. MOON, VIRGIL M. Heredity as a factor in the etiology of neoplasms. *Medical Rec.* 97: 14-16. 1920.—Author records an autopsy on a man who died of carcinoma of the bladder. This man's brother, father, grandfather, and one uncle had likewise died of carcinoma.—He also cites a case of a man who died of pneumonia. The father, brother, and one uncle had each died of cancer. The deceased man had no evidence of cancer, but revealed on autopsy a well developed carcinoma of the stomach.—A short review is given of the observations and statistics of WILLIAMS, BUTLIN, MUNN, WARTHIN, EWIN and MAUD SLYE on the heredity of cancer and other tumors in man and other animals. The conclusion is reached that a tumor-producing potentiality is an hereditary trait and that the conditions which are assigned by pathologists as possible causes of cancer probably act merely as exciting or determining factors in individuals who have received a tendency to the neoplastic type of growth as a heritage from their ancestors.—*Geo. N. Papanicolaou.*

301. MOORE, CARL R. Sex-gland transplantation and the modifying effect in rats and guinea-pigs. [Abstract.] *Anat. Rec.* 20: 194. 1921.—In the white rat, testicular tissue grafted into young, spayed females, will persist for a period of nine months. Associated with the testicle graft the behavior of the animal is decidedly male-like.—Ovaries transplanted into young, castrated males will persist and grow for several months. Such an animal, as an adult, exhibits a maternal behavior towards the young. Somatic differences between male and female are too slight to be of value in a differential diagnosis of maleness or femaleness.—In guinea-pigs, ovaries grafted into young, castrated males persist for several months and are accompanied by certain somatic modifications in the male; the teats of the mammary glands hypertrophy and compare favorably in size with those of pregnant females, though little or no secretion could be expressed. Psychological modifications of the male are not, in the author's experience, subject to modification.—Testicular tissue grafted into young, spayed females can be recovered nine months later. No mature sperm were present in the seminiferous tubules but active mitoses were common in cells of the germinal epithelium, a considerable amount of which may remain. Females bearing such testicle grafts exhibit the characteristic male sex behavior (psychical modification) and the external genitalia appear male-like (somatic modification).—In the white rat ovarian grafts will persist for eight months in a male with 1 normal testicle. Graafian follicles continue their development normally up to the maturation period of the ovum. Subsequently the follicles undergo atresia without ovulation.—There appears to be no deleterious influence of secretions from either sex gland upon the opposite one.—*Carl R. Moore.*

302. MORGAN, T. H. The effects of castration of hen-feathered Campines. *Biol. Bull.* 39: 231-247. 10 fig. 1920.—Completely castrated hen-feathered male Campines develop normal male plumage.—*H. D. Goodale.*

303. MORGAN, T. H. The effects of ligating the testes of hen-feathered cocks. *Biol. Bull.* 39: 248-256. 11 fig. 1920.—Ligation of the testes, if sufficient to cause complete degeneration of the testes, results in assumption of male plumage by hen-feathered adult cocks.—*H. D. Goodale.*

304. MORGAN, T. H. The genetic factor for hen-feathering in the Seabright Bantam. *Biol. Bull.* 39: 257-259. 1920.—Additional data are given, but without settling definitely whether one or two factors are involved, and proof is presented that the character is not sex-linked.—*H. D. Goodale.*

305. MULLER, H. J. Further changes in the white-eyed series of *Drosophila* and their bearing on the manner of occurrence of mutation. *Jour. Exp. Zool.* 31: 443-473. 3 fig. 1920.—Three new mutations of the *W* gene in the X chromosome of *Drosophila* are described, the characters produced being ecru, a straw color, ivory (found by A. H. STURTEVANT) and a new white. In addition an orange-eyed male appeared which did not transmit its mutant eye color. A consideration of the manner in which these characters appeared suggests that the mutations which produced them occurred at various times,—the first in a late oögonial cell or

oöcyte, the second in an early stem cell of the ovary, and the third in the early cleavage of the individual in which it appeared. It is possible that the orange eye arose by a mutation of the *W* gene in a somatic cell of the early embryo. The commonly accepted view that mutations are more likely to occur in gametes or germ cells near the period of maturation receives no support from the data on this series. It is shown, however, that there is a much greater chance that any mutation will show itself in a single individual than in several. Further study of the allelomorphs of the white-eye series suggests other important conclusions with respect to the origin of mutations. Since mosaic mutants involving recessive sex-linked genes are always males, it would appear that mutations occur in only one member of a pair of chromosomes at any one time. If the event which produces a mutation is so localized as to affect a single locus in only one of a pair of homologous chromosomes it seems unlikely that the artificial influencing of the kind of mutation is a possibility. It is further noted that the variations of the *W* gene are not random deviations for they are all in a definite direction, and the extreme variants seem to be the more common. For this reason selection if concerned with this locus alone would not be cumulative.—*H. H. Plough.*

306. MULLER, H. J., AND E. ALTENBURG. A study of the character and mode of origin of eighteen mutations in the X-chromosome of *Drosophila*. [Abstract.] *Anat. Rec.* 20: 213. 1921.—Since the 18 mutants found in the experiment of the writers on mutation frequency were non-selected or random samples of (detectable) mutants in the sex-chromosome, a study of them furnishes quantitative data bearing on the nature of mutations. (1) All were lethals or sub-lethals. Of the 5 sub-lethals, 4 produced morphological abnormalities. (2) All were completely recessive except 1 mutant of the yellow-mouse type. (3) Half of the loci involved are crowded into the 1.5 units space to the left of white eye (the rest being scattered rather evenly). This indicates that this region of the chromosome is really much longer than the map represents. (4) All the lethals gave negative tests for "deficiency," hence deficiencies are evidently much rarer than ordinary lethal mutations. (5) Three lethals were allelomorphs of known non-lethal factors, and 2 of these lethals were allelomorphs of each other. Of the latter 1 became dominant in its lethal effect when crossed to a non-lethal allelomorph. (6) Lethals very near 'duplicated' loci remained unaffected by the 'duplication.' (7) Mutation occurs with not markedly different frequency in the 2 sexes, for 7 of the lethals were found in the maternal, 11 in the paternal chromosome. (8) These mutations occur not only near maturation, but also in earlier germ cells, in either sex, as shown by the original appearance of some of the lethals in 2 sisters simultaneously. (9) Two of the original mutant individuals contained 2 different lethals at once; in 1 case these were in opposite chromosomes, in the other case in the same chromosome.—*H. J. Muller and E. Altenburg.*

307. NEWMAN, H. H. The experimental production of twins in the starfish *Patiria miniata*: with a discussion of the causes of twinning in general. [Abstract.] *Anat. Rec.* 20: 190-191. Jan. 20, 1921.—A series of separate twins and of double monsters were produced under 3 different experimental conditions: (a) As the result of an extremely belated parthenogenetic development; (b) as the result of fertilizing *Patiria* eggs with the sperm of another species of starfish; (c) as the result of overcrowding normally fertilized eggs. All 3 methods involve retardation of development, with loss of precise axiate organization at some critical period. Redifferentiation or resumption of axiate organization occurs, but unity of organization has been lost, so that 2 or more axes or gradients appear instead of the original 1. Thus twins or double structures arise.—A series of twin types are produced which represent the results of differences in the earliness of onset of retardation and more or less complete recovery. The series includes completely separated half-sized and quarter-sized blastulae and gastrulae, full-sized gastrulae with 2 or more archentera, larvae in which the archenteron branches anteriorly into "dicephalous" larvae, and advanced bipennariae with paired, instead of only left-hand, madreporic pores and pore-canals. This physiological theory of twinning agrees with the writer's formerly expressed theory to explain the cause of specific polyembryony in the armadillo.—*H. H. Newman.*

308. OKKELBERG, PETER. The early history of the germ cells in the brook lamprey, *Entosphenus wilderi* (Gabe), up to and including the period of sex differentiation. [Abstract.] *Anat. Rec.* 20: 201. 1921.—The germ cells are segregated before the germ layers are definitely established. They are first recognized about the time when the mesoderm separates from the endoderm (embryo about 191 hours old). The definite germ cells, in both sexes, take their origin from these primordial germ cells, and from no other source. Numerous germ cells degenerate in every individual and they never take part in the formation of somatic structures. During the period of sex differentiation 2 types of cells are found in practically every individual, those which continue to divide and those which stop dividing and enter upon a synaptic and growth phase. The former are taken to be potential male cells (spermatogonia) or indifferent cells and the latter potential female cells (primary oöcytes). The relative proportion of the 2 kinds of cells apparently determines whether the larva shall become a male or a female. Observations seem to warrant the conclusion that each larva carries in it the potentiality of both sexes and that sex, therefore, is not irrevocably fixed at or before fertilization. When a larva becomes definitely established as a male there rudimentary eggs are frequently found in the adult testis. In the adult condition the number of individuals of each sex is about the same.—*Peter Okkelberg.*

309. ORENSTEEN, MYER M. Correlation of cephalic measurements in Egyptian born natives. *Biometrika* 13: 17-24. 1920.—Means, standard deviations, and coefficients of correlation of length and breadth of head are given for different provinces. Correlation ranges from $+0.208 \pm 0.033$ to $+0.369 \pm 0.028$.—*John Rice Miner.*

310. OSLER, H. S. Origin and development of pedigreed varieties of grains. *Michigan Acad. Sci. Ann. Rept.* 21: 139-143. 1919.—Important varieties of small grains came into use largely in three ways, introduction, selection, and hybridization. The origin of a number of improved varieties is given. The method of production and the distribution of Red Rock wheat and Rosen rye is briefly summarized.—*H. K. Hayes.*

311. PELSENEER, PAUL. L'hybridation chez les Mollusques. [Hybridization in molluscs.] *Compt. Rend. Acad. Sci. Paris* 168: 1056-1059. 1919.

312. PÉZARD, A. Loi du "tout ou rien" ou de constance fonctionnelle, relative à l'action du testicule considéré comme glande endocrine. [Law of "all or nothing" or of functional constancy relative to the action of the testis considered as an endocrine gland.] *Compt. Rend. Acad. Sci. Paris* 172: 89-92. 1921.

313. PÉZARD, A. Secondary sexual characteristics and endocrinology. *Endocrinology* 4: 527-540. 2 fig. 1920.—A number of secondary sexual characters are dependent upon internal secretion of testis. Effect of secretion begins at puberty and continues, in poultry, through sexual life with remarkable constancy. Effect is lost with removal of testis, but not more than $\frac{1}{3}$ of total weight of testis is required to produce effect. Any fraction of testis large enough to produce any morphogenetic effect produces the entire effect (tested on combs). Some characters recognized as racial are dependent on this secretion. Meat diet produces modification in structure and sexual behavior, not directly, but by first inducing changes in testis.—*A. Franklin Shull.*

314. PLAHN-APPIANI. Die Individualität von Zucker- und Futterrübe. [Individuality of sugar beets and fodder beets.] *Centralbl. Zuckerindust.* 27: 220-221. 1919.—Author refers to doubt sometimes expressed about distinguishing certain white fodder beets from sugar beets. He would not ascertain sugar content as this is transgressive in its variation but would use a criterion dependent on structural characteristics as specific weight or data on volume secured in calculation of specific weight. The volume figures for sugar beet lie between 92 and 95 and for fodder beets from 97 to over 100.—*James P. Kelly.*

315. P[OPENOE], P. A contribution to eugenics. [Rev. of: DUNLAP, KNIGHT. Personal beauty and racial betterment. C. V. Mosby Co.: St. Louis, 1920.] Jour. Heredity 11: 258. 1920.

316. P[OPENOE], P. Eugenics made easy. [Rev. of: HUMPHREY, SETH K. The racial prospect. 261 p. Charles Scribner's Sons: New York, 1920.] Jour. Heredity 11: 237. 1920.

317. P[OPENOE], P. A French student of the birth-rate. [Rev. of: RAGEOT, GASTON. La Natalité. (Natality.) 296 p. Ernest Flammarion: Paris, 1918.] Jour. Heredity 11: 237. 1920.

318. P[OPENOE], P. A text book of biology. [Rev. of: SHULL, A. FRANKLIN, GEORGE LA RUE, AND ALEXANDER G. RUTHVEN. Principles of animal biology. 16 X 24 cm., ix + 441 p., 245 fig. McGraw-Hill Book Co.: New York, 1920.] Jour. Heredity 11: 214. 1920.

319. PUNNETT, R. C., AND P. G. BAILEY. Genetic studies in poultry. II. Inheritance of egg-colour and broodiness. Jour. Genetics 10: 277-292. 1 pl., 11 fig. 1920.—Reciprocal crosses between Brown Leghorns which are not broody and lay white eggs and Black Langshans which are broody and lay brown eggs, also crosses between the Langshans and Gold-Pencilled Hamburgs, were made with the following results.—Egg color:—Leghorn ♀ X Langshan ♂: F₁, intermediate; F₂, nearly half white, the rest tinted, but mostly lighter tints. Reciprocal cross: F₁, as before; F₂, all shades represented, but curve slightly bimodal. Langshan ♀ X Hamburg ♂: F₁, as before; F₂, all grades represented and curve distinctly bimodal. The results in this case are explained on the basis of a major factor for egg pigment and several minor factors all of which are thought to be present in the Langshans and absent in the others.—Broodiness: Leghorn ♀ X Langshan ♂: F₁, broody; F₂, 19 broody, 47 non-broody. Langshan ♀ X Leghorn ♂: F₁, broody; F₂, 8 non-broody. Langshan X Hamburg: F₁, slightly broody; F₂, 4 broody, 34 non-broody.—H. G. May.

320. RICHET, CHARLES. La sélection humaine. [Human selection.] 8°, 262 p. F. Alcan: Paris. 1919.

321. RICHET, CHARLES, ET HENRY CARDOT. La transmission héréditaire des caractères acquis et l'accoutumance des microbes. [The hereditary transmission of acquired characters and the tolerance of the microbes.] Compt. Rend. Acad. Sci. Paris 171: 1353-1358. 1920.

322. RIDDLE, OSCAR, AND ELLINOR H. BEHRE. On the relation of stale sperm to sterility and sex in ring-doves. [Abstract.] Anat. Rec. 20: 211. 1921.—The very abnormal sex ratios obtained from hybrid birds by several investigators require the study of all factors possibly concerned. Practical work in pigeon hybridization also sometimes requires a knowledge of the length of time the sperm may remain alive in the female oviduct. On the latter point, it is found that the spermatozoa of the ring-doves (mostly fully fertile hybrids of closely related species) used retained their fertilizing power during very nearly 8 days, reckoned from the time of isolation of the male to the hour the egg is laid.—“Staleness” of the spermatozoa did not appreciably affect the sex ratio in 213 individual tests made with a dozen pairs of birds. The degree of staleness was known in each test. Some of the sex ratios obtained during the experiment cannot be considered normal but these abnormal ratios have been shown to be associated with other factors investigated earlier. The abnormal sex ratios that have been obtained in previously reported investigations on these doves, and any results that may be later obtained from them or from similar birds, are here shown to be not complicated by effects due to staleness of the spermatozoa.—Oscar Riddle and Ellinor H. Behre.

323. RIOLLE, Y. TROUARD. Les hybrides de *Raphanus*. [Raphanus hybrids.] Rev. Gén. Bot. 32: 438-447. Fig. 1-3. 1920.—The author previously studied hybrids of *R. Raphanistrum* with varieties of *R. sativus* and found superficial homogeneity in F₁ and visible dissociation in F₂. She now attempts to demonstrate that while F₁ is homogeneous

as a whole, individual plants themselves are extremely variable. Reciprocal hybrids of *Raphanistrum* and *sativus* were highly vigorous and gave comparable results under a variety of conditions. F_1 flowers as a rule were white, but there were exceptions, especially in later blossomings. One plant had one twig white-flowering and one yellow-flowering. In later blossomings some flowers were observed with two petals white and two yellow and some flowers showed tinges of rose or violet at end of blooming period. Structure of silique seemed to be intimately connected with color of flower and varied within wide limits on hybrid plants, the limits on parents being much narrower. Sugar content was high and starch low in the hybrids as in radishes, a condition contrary to that in *R. Raphanistrum*. In character of anthocyanin radishes may be divided into 3 groups: Rose or red; violet; black, gray or white. Red \times black or gray gives violet. Red \times yellow gives violet, but with dissociation, which indicates that yellows are themselves hybrids. Red \times violet gives violet, but the author considers dominance of violet here simply a matter of concentration of violet pigment, for a mixture of solutions of red and violet anthocyanin gives violet solution. In F_2 every possible combination of parental characters occurs as regards color of flower, structure of silique, and root development; but there are all sorts of intermediates, and types which appear to return to those of parent are not identical with them. It is argued that this demonstrates that MENDEL's law is only a directive one. From her studies of F_1 populations the author concludes that law of uniformity of F_1 is not absolute. She favors NAUDIN's idea that the hybrid is a living mosaic of more or less discordant elements which may at times visibly dissociate in F_1 individuals. She argues that everything connected with life is mobile and changing and that it is practically impossible to generalize from particular bases. MENDEL's law does not, therefore, approach the validity of a mathematical law.—*R. E. Clausen.*

324. ROBB, WILLIAM. Plant breeding experiments at the University of St. Andrews (Conducted by the late John H. Wilson). *Scottish Jour. Agric.* 3: 391-402. 2 pl., 2 fig. 1920. —Dr. WILSON was responsible for the establishing of extensive plant-breeding experiments in Scotland. The accomplishments of the last four years preceding his death have not been previously published. During these years he grew many thousands of hybrid potato seedlings and had reduced his stocks to 240 selected varieties. In a cross of Sandy and Golden Rain oats the F_1 and F_2 plants all had more or less one-sided panicles while both parents have open spreading panicles. In the F_2 progeny of a cross between Daubeny and Huskless oats were types with two awns to the spikelet and an articulation suggestive of the wild oat, *Avena fatua*.—*H. V. Harlan.*

325. ROBERTS, E. A note on inheritance of polydactylism in cattle. [Abstract.] *Anat. Rec.* 20: 211. 1921.—A normal bull mated to a polydactylous cow produced a polydactylous female. This daughter produced, from matings to a normal bull, 3 calves all of which showed the polydactylous condition.—*E. Roberts.*

326. ROBERTS, HERBERT F. Yellow-berry in hard winter wheat. *Jour. Agric. Res.* 18: 155-169. 2 fig. 1919.—See Bot. Absts. 6, Entry 32.

327. ROBERTSON, W. R. B. Further studies on inheritance of color in the turkey. [Abstract.] *Anat. Rec.* 20: 213-214. 1921.—The pattern of the black variety is allelomorphic to the pattern of the bronze. Black is almost, not entirely, dominant, there being usually about 6 bronze feathers widely distributed. F_1 black (bronze) σ^7 back-crossed to his bronze dam gave 50 per cent of F_2 bronze and 50 per cent black. An F_1 black (bronze) ϕ by a bronze σ^7 gave the same result. The bronze of F_2 , mated inter se, gave only bronze, the F_1 blacks gave black and bronze.—Black is likewise allelomorphic to the bourbon red and the Narragansett patterns. A bourbon red ϕ by the F_1 black (bronze) σ^7 gave 50 per cent bronze-red intermediates, like F_1 of the bronze by red cross, and 50 per cent a rusty black. An F_1 black (bronze) ϕ by a bourbon red σ^7 gave 50 per cent bronze-red intermediate and 50 per cent rusty black. The latter shows a slight trace of barring with white in the primaries. A Narragansett ϕ by an F_1 black (bronze) σ^7 gave 50 per cent black and 50 per

cent bronze.—The last cross shows also that the Narragansett pattern is probably allelomorphous to bronze. Narragansett is also likely allelomorphous to bourbon red. Reciprocal crosses gave F_1 much like the Narragansett but with subterminal black bands less intense and slaty regions slightly auburn.—These 4 patterns evidently form a system of quadruple allelomorphs.—White is recessive to color. A white ♀ by a bourbon red ♂ gave F_1 all bronzed intermediate; she evidently carried bronze but lacked the factor for color. Bronze ♀ by white ♂ gave bronze. F_2 was 75 per cent bronze and 25 per cent white.—W. R. B. Robertson.

328. ROBERTSON, W. R. B. Unusual tetrads and their bearing on the problem of crossing-over. [Abstract.] Anat. Rec. 20: 199. 1921.—Among the ring-like tetrads resulting from the pairing of compound chromosomes, such as occur in *Chorthippus curtipennis*, there have been found again cases of a condition in which the 2 strands of 1 of the members of a pair show 1 complete revolution about each other which is not present in the strands of the other member of the pair. This torsion occurs, of course, in a region of the tetrad where disjunction has taken place—that is, at an internode between 2 points of the tetrad which are still in conjunction.—This may mean: (1) That the pairing chromosomes were each split and the halves independently twisted about each other before parasynapsis took place; or (2) that crossing-over between 1 strand of each of the conjugants has taken place at some previous time.—If the latter be the correct interpretation, then opposite sides of the ring would each receive 1 strand of the paternal and one of the maternal pair, and the 1st division be accordingly equational for the bulk of the tetrad.—The important point, however, is that the crossing-over hypothesis gives a very satisfactory explanation of the abnormality.—W. R. B. Robertson.

329. RYX, GEORG VON. Methoden einer exakten Prüfung des Fortschrittes bei der Zuckerrübenzucht. Paritäts- und doppelte Standard-methode. [Methods of exact testing the advancement in sugar-beet breeding. Parity and double standard method.] Zeitschr. Pflanzenzücht. 7: 227-237. 1920.—Author discusses need for constant standard by which to judge results of progress in sugar beet breeding, explaining that one lot of seed cannot be kept for that purpose because of its deterioration in storage. He explains two standards and how to secure them: (1) Parity method, or method of direct comparison with standard beet specimens, in which a line is bred pure and maintained pure for purposes of comparison. (2) Double standard method, or method of comparison with a corrected and doubly checked standard, in which half the seed from each season is planted in turn the next two seasons.—H. B. Tukey.

330. SAKAMURA, T. Experimentelle Studien über die Zell- und Kernteilung mit besonderer Rücksicht auf Form, Grösse und Zahl der Chromosomen. [Experimental studies on cell and nuclear division with special reference to form, size, and number of chromosomes.] Jour. Coll. Sci. Imp. Univ. Tokyo 39¹: 1-221. 7 pl., 24 fig. 1920.—The paper is chiefly of interest to cytologists but the following conclusions are important for geneticists. Chromosomes were found normally to be constant in number and to retain their identity. Constrictions produced by attachment of spindle fibers were found to be of wide occurrence in plants and animals and to serve as excellent marks of identification of particular chromosomes. Fragmentation sometimes occurs at constrictions and increases the chromosome number. Such fragmentations become heritably fixed and give rise to varieties with deviating chromosome numbers. Such abnormalities, as well as those due to failure of particular pairs to segregate, are brought about by conditions in surrounding cytoplasm and are the effects of outer or inner factors which may also produce mutation by direct action on the germ-plasm. Nearly related species and varieties of some genera, e.g., *Triticum*, differ by multiples of the x or reduced number characteristic of the ancestral species. Fragmentation, failure to segregate (non-disjunction), inclusion of two or more nuclei in one cell or one membrane may be produced by physical or chemical means or by influence of parasites. Author did not secure normal development of pollen grains with such unusual chromosome equipment.—Leonas L. Burlingame.

331. SCHIEMANN, E. Zur Frage der Brüchigkeit der Gerste—eine Berichtigung. [On the question of brittleness in barley—a correction.] Zeitschr. Indukt. Abstamm.- u. Vererb. 21: 53. 1919.—A correction of a misstatement in an earlier paper, due to a typographical error, and a reply to a criticism of the author's interpretation of the inheritance of brittleness of rachis in barley crosses.—C. B. Hutchinson.

332. SCHMIDT, JOHS. IV. The genetic behaviour of a secondary sexual character. Compt. Rend. Trav. Lab. Carlsberg 14: 1-12. 6 pl. 1920.

333. SCHRADER, FRANZ. Peculiar chromosomal phenomena in a Homopteran. [Abstract.] Anat. Rec. 20: 200-201. 1921.—In *Pseudococcus nipae*, a Homopteran, both sexes have a diploid number of 10 chromosomes. In the female, 5 tetrads are formed and reduction results in the haploid number of 5 chromosomes as in the ordinary manner. In the male, the growth stages of the spermatocytes show 5 of the 10 chromosomes condensing in advance of the remaining chromosomes. These 5 chromosomes can be identified in following stages by the tendency to remain in a more or less clumped group. No trace of tetrad formation could be found. The 1st spermatocyte division is equatorial and 10 chromosomes go to each pole. The 2nd division is reductional and this apparently takes place in that the 5 clumped chromosomes go to one, and the remaining 5 to the opposite pole. Early spermatids still show 5 chromosomes and the formation of spermatozoa seems to follow ordinary lines.—Franz Schrader.

334. SCHULTZ, WALTHER. Kälteschwärzung eines Säugetieres und ihre allgemeinbiologischen Hinweise. [Darkening of a mammal by cold and its general biological significance.] Arch. Entwicklungsmech. 47: 43-75. 12 fig. 1920.

335. SIRKS, M. J. [Dutch rev. of: GOLDSCHMIDT, R. Der Mendelismus in elementarer Darstellung. [Elementary presentation of Mendelism.] 77 p., 15 fig. P. Parey: Berlin, 1920.] Genetica 2: 532-533. 1920.

336. SIRKS, M. J. [Dutch rev. of: GOLDSCHMIDT, R. Einführung in die Vererbungswissenschaft. Zwanzig Vorlesungen für Studierende, Aerzte, Züchter. Dritte neubearbeitete Auflage. [Introduction to the science of genetics. 20 lectures for students, physicians, breeders.] 3rd revised ed., 519 p., 178 fig. W. Engelmann: Leipzig, 1920.] Genetica 2: 533-534. 1920.

337. SIRKS, M. J. [Dutch rev. of: HERIBERT-NILSSON, NILS. Ein Übergang aus dem isogamen in den heterogamen Zustand in einer Sippe der Oenothera Lamarckiana. (A transition of the isogamic to the heterogamic condition in a strain of Oenothera Lamarckiana.) Hereditas 1: 213-220. 1920.] Genetica 2: 545-546. 1920.

338. SIRKS, M. J. [Dutch rev. of: MALINOWSKI, EDMUND. Die Sterilität der Bastarde im Lichte des Mendelismus. (The sterility of hybrids in the light of Mendelism.) Zeitschr. Indukt. Abstamm.- u. Vererb. 22: 225-235. 1920.] Genetica 2: 540-542. 1920.

339. SKUPIENSKI, F.-X. Sur la sexualité chez une espèce de Myxomycète Acrasiée Dictyostelium mucoroides. [On sexuality in a species of Acrasie Dictyostelium mucoroides.] Compt. Rend. Acad. Sci. Paris 167: 960-962. 1918.

340. STEINACH, E. Verjüngung durch experimentelle Neubelebung der älternden Pubertätsdrüse. [Rejuvenation through experimental revitalization of the senile sex glands.] Arch. Entwicklungsmech. 46: 557-619. 9 pl., 7 fig. 1920.—By the use of two methods, viz., section of the vas deferens and transplantation of gonads, Steinach has brought about rejuvenescence in senile rats. Great care was used to make sure that the rats were really senile before each experiment was begun. Histological examinations of the testes were made. After section of the vasa deferentia, a multiplication of Leydig's cells took place, accompanied by a return to the normal vigorous condition of rats in the prime of life. The span of life of these rats exceeded the normal by about 25 per cent. A rejuvenescence also was observed in 3 old men on whom similar operations were performed. Transplantation of testes and ovaries gave like results.—H. D. Goodale.

341. STURTEVANT, A. H. The vermilion gene and gynandromorphism. *Proc. Soc. Exp. Biol. Med.* 17: 70-71. 1920.—MORGAN and BRIDGES (*Carnegie Inst. Washington Publ.* 278. 1919) conclude from a study of gynandromorphs that the somatic appearance of any part of the body is due to its own chromosomal constitution. A gynandromorph obtained by the writer indicates that this is not true for all factors. The father of the gynandromorph carried several sex-linked characters including vermilion, none of which were present in the mother. The whole head of the gynandromorph was male in constitution, since it showed all the sex-linked characters of the father except vermilion. It is apparent therefore that the vermilion eye color is not determined by the genetic constitution of the eye pigment cells but by that of some other part of the body.—*H. H. Plough.*

342. TENNENT, DAVID H. Chromatic material in hybridization. [Abstract.] *Anat. Rec.* 20: 229. 1921.—Closeness of relationship is by no means indicative of the readiness with which the initial impulse to development may be received, nor a sure criterion of the extent to which it may proceed. Some species hybridize in nature; some eggs show a cortical block which may be removed readily by various methods. The entrance of a spermatozoön following the removal of the cortical block may result in development, or it may result in an instantaneous, or in a slower but none the less complete cytolysis of the egg.—In some crosses, in which a specialized type of development is superimposed on a more general type, development proceeds regularly up to the point of deviation of special from general. Internal block may become effective apparently at any stage after the entrance of the spermatozoön. Many degrees of inhibition, ranging from failure of the germ nuclei to unite to failure of synapsis, have been described, but no methods of overcoming its effects have been devised.—From our knowledge of straight-fertilization and of cross-fertilization we have come to look upon development as an attribute of the egg. In eggs of *Arbacia* fertilized by sperms of *Möira*, an interordinal cross, a rhythmic appearance of basophilic bodies in the cytoplasm may be seen. A similar phenomenon has been described in many species-fertilized eggs. By the application of binuclearity hypotheses, founded in part on the chromidial hypothesis, to the metazoan cell, these basophilic bodies have been explained as somatochromatin or trophochromatin. The evidence for the emission of chromatin as such from the nucleus is not convincing. In the conditions of the experiment mentioned, a foreign enzyme was introduced. Its presence produced a coalescence of granules into coarsely dispersed aggregates. It is suggested that this coalescence is a result of dehydration due to the activity of the foreign enzyme in the cytoplasm. These bodies are regarded as synthesized in the cytoplasm. We cannot hope to distinguish between more than very widely spaced steps in synthesis within the cell by methods of staining. The egg and spermatozoan may form a harmonious system, the degree of harmony being a function of cytoplasmic substrate and nuclear enzyme.—*David H. Tennent.*

343. UBISCH, G. VON. II. Beitrag zu einer Faktorenanalyse von Gerste. [Contribution to a factorial analysis of barley.] *Zeitschr. Indukt. Abstamm.- u. Vererb.* 20: 65-117. 7 fig., 11 diagrams. 1919.—The results of barley hybridization experiments to determine gametic formulae for nine characters, are given. On the factor basis the conclusions are as follows: (1) Brittleness of rachis; two factors both of which must be present in either homozygous or heterozygous condition in order to produce brittleness. The character is, however, affected by moisture conditions at maturity and by the physiologically correlated laxity of spike. (2) Length of rachis internodes; one or more lengthening factors may be present. In *Hordeum spontaneum* three are present in homozygous condition. (3) Sterility of side florets; two factors involved but no data are given. (4) Awn length—there is one lengthening factor *A*. *A* alone or modified by presence of either of two other factors gives awn length of common barleys. All three present in homozygous condition produce wild awn type. If *A* is absent, shorter awns result due to the modifying effect of the other factors. (5) Hoods,—either one or two factors act in conjunction with *A*, the factor for long awns. Alternative interpretations are offered of the peculiar case of long awns appearing in F_2 generation in crosses between hooded and short-awned forms. Data are cited showing linkage between factors for long awn and laxness of spike; similarly for short awn and density of spike. (6) Culm length,

—height of culm is governed by presence of one or more of three possible factors. Data are given showing linkage between tall culms, long awns, and lax spike. (7) Hulllessness of kernel, (8) color of glumes, and (9) type of basal bristle are each due to a single genetic factor difference.—*F. P. Bussell.*

344. VEIT, OTTO. Studien zur Theorie der vergleichenden Anatomie. (Die Rolle der Ontogenie in der Phylogenie.) [Studies on the theory of comparative anatomy. The rôle of ontogeny in phylogeny.] Arch. Entwicklunsgmech. 47: 76-94. 1920.

345. WALTHER, AD. R. Sammelreferat, betreffend einige neuere Arbeiten über die Vererbung quantitativer Eigenschaften. [Composite review of a few recent works on the inheritance of quantitative characters.] Zeitschr. Indukt. Abstamm.- u. Vererb. 24: 282-289. 1920.

346. WHITING, P. W. The production of mosaic males from fertilized eggs in Hymenoptera. [Abstract.] Anat. Rec. 20: 210. 1921.—An orange-eyed mutation in the wasp, *Hadrobracon*, acts as a complete recessive to the normal black. Inheritance is "sex-linkoid," the males being haploid and usually parthenogenetically produced. Heterozygous females, isolated as virgin, produce black and orange males in equal numbers. When orange males are mated to black females all offspring are black. In reciprocal mating, daughters are black and most of the sons are orange. A few of the sons, however, are black, showing that they come from eggs into which the black-bearing spermatozoön has penetrated. Such anomalous blacks have in some cases bred like black, showing that gonads, as well as eyes, are paternal in origin. Others have bred like orange, showing that, while eyes are paternal, gonads are maternal. Orange-eyed brothers of anomalous blacks have bred like normal orange, except that in 1 case such a male bred like a black. Any one male when bred to orange female produces either black or orange daughters, never both, showing that gonad is haploid and either paternal or maternal in origin.—*P. W. Whiting.*

347. WOODS, F. A. The meaning of continuous variation in color. Jour. Heredity 11: 84-86. 1 fig. Feb., 1920.—A plate of 20 specimens of the beetle *Rhynchophorus cruentus* showing a "perfectly continuous graduation in a color pattern," with brief textual comment.—*H. J. Banker.*

348. WOODS, FREDERICK ADAMS. A definition of heredity—"Nature vs. Nurture" not a good expression. Jour. Heredity 10: 426-427. Dec., 1919.—The lack of "scientific definiteness" is pointed out in the terms "nature" and "nurture" because of the many senses in which the words are used, and the use of the expression "heredity" is criticized for the same reason.—*Howard J. Banker.*

349. WOODS, FREDERICK ADAMS. Portraits of early Americans. Jour. Heredity 10: 212-222. Fig. 13-18. May, 1919.—A "Review and supplementary research based upon 'The Founders: Portraits of Persons Born Abroad Who Came to the Colonies in North America before the Year 1701' by Charles Knowles Bolton." The writer believes he finds evidence from this collection and other portraits that there has been a progressive change in the physiognomy of the Nordic race from the mongoloid to the deep-set eye and in other characters.—*Howard J. Banker.*

350. YAMAGUCHI, YASUKE. Kurze Mitteilung über die Beziehung der Aufblühzeit und des Sitzes der Blüte am Rispenaste zum Korngewichte des Reises. [Brief report on the relation between flowering time and position of the flower on the inflorescence to seed weight in rice.] Bot. Mag. Tôkyô 34: 136-139. 1 fig. 1920.

351. YAMAGUCHI, YASUKE. Über die Beziehung der Aufblühzeit und des Sitzes der Blüte am Rispenaste zum Korngewichte des Reises. [The relation of flowering time and the position of the flower on the inflorescence to seed weight in rice.] Ber. Ohara Inst. Landw. Forsch. 1: 451-517. 35 fig. 1919.

352. YASUI, KONO. Genetical studies in *Portulaca grandiflora*. Bot. Mag. Tôkyô 34: 55-65. Pl. 1 (colored), fig. 1. 1920.—Crosses are described between single and double races belonging to 7 color types. Doubleness is dominant. Yellow is due to a yellow flavone derivative, which in the presence of a reducing factor *R* yields a magenta anthocyanin. White races lack either the chromogen factor *C* alone or both *C* and *R*. Yellow single by white single $CCrr \times ccRR$ gives magenta F_1 $CcRr$ and F_2 by selfing of 9 magenta, 3 yellow, and 4 white. Hybrid double magentas $CcRrDd$ by white singles $ccRRdd$ give magenta doubles, magenta singles, white doubles, and white singles in equal numbers. By yellow single they give equal numbers of yellow and magenta ($CcRrDd \times CCrrdd = 1CCRrDd : 1CcRrDd : 1CCrrdd : 1CcRrdd : 1CCrrDd : 1CerrDd : 1CCrrdd : 1Cerrdd$). Double whites $CcRrDd$ by pale yellow singles $CCrrdd$ give equal numbers of magenta and yellow doubles and singles. Single scarlet by double white gives magenta double, which mated to single white gives equal numbers of magenta and white doubles and singles. The selfed singles from this give singles only; the selfed doubles, 3 doubles to 1 single. The single mated to the doubles give 1 : 1 ratio.—L. L. Burlingame.

353. ZELENY, CHARLES. The direction and frequency of mutation in a series of multiple allelomorphs. [Abstract.] Anat. Rec. 20: 210-211. 1921.—Full eye, bar eye, and ultra-bar eye in *Drosophila melanogaster* constitute a series of multiple allelomorphs with decreasing facet number and increasing dominance. Bar arose from full and ultra-bar from bar. Observations were made of the direction and frequency of mutation within pure stocks of the members of the series. In the full-eye stocks no mutations to bar or ultra-bar were observed during a period of 6 years among 46,290 counted individuals and among a much larger number of uncounted ones. On the other hand, the reverse mutation from bar to full occurred 52 times among 84,159 individuals or once in 1618, and from ultra-bar to full 5 times out of 8681, or once in 1736. Correspondingly there were only 3 mutations of bar to ultra-bar, including the original mutant, among 84,159 individuals or 1 in 28,053, while the reverse mutation of ultra-bar to bar occurred 3 times in 8681 or once in 2894 and was observed also at another time when the number of individuals examined was not being recorded. Selection for high and low facet number had no effect upon the frequency of any of the mutations.—In this allelomorphic series therefore (1) reverse mutations are much more frequent than the original ones, (2) original progress to ultra-bar is through bar but reversion may go back directly to full as well as through bar, and (3) the frequency of mutation is independent of upward and downward selection.—Charles Zeleny.

354. ZINN, JACOB. On variation in Tartary buckwheat, *Fagopyrum tataricum* (L.) Gaertn. Genetics 4: 534-586. 11 fig. 1919.—This publication records the results of a study of a highly variable, ever-sporting race of *Fagopyrum tataricum* Gaertn. discovered by the author. A strain was isolated which produced a large number of flowers with supernumerary carpels, the number of carpels varying from the normal 3 to as high as 25. The frequency of abnormal flowers as a rule decreased with increase in number of carpels. In those flowers having more than 6 carpels there was a tendency for an even number of carpels to occur more frequently than an odd number. Associated with the abnormal gynoecia are abnormal perigones with segments varying from the normal 5 to as high as 18. There is some correlation between abnormal number of carpels and abnormal number of perigone segments. The proportion of abnormal flowers in a given race depends on the environment and is very constant under a given set of environmental conditions. The condition of nutrition had little or no effect on this ratio but high temperature and humidity seemed to increase the proportion of abnormal flowers. Selection for 5 years had no effect on the ever-sporting race. The greatest abnormal development occurred on the 3 lower branches and in the basal region of the terminal raceme. Other variations noted, which seemed to be of the same type, were floral proliferations, often giving rise to syncarpous fruits and fasciation of vegetative parts.—T. O. Sprague.

355. ZINN, JACOB. Wheat investigations. 1. Pure lines. Maine Agric. Exp. Sta. Bull. 285. 49 p., 3 pl., 8 fig. 1920.—In 1916, 259 pure lines of wheat were planted at Aroostook

Farm. These had been taken from local fields devoted to following varieties or groups: Red Fife, Preston, Bluestem, Marquis, Canada Red (Ladoga), unnamed, and durum. In 1917 these were reduced to 91. Seven pure lines secured from Minnesota were added. These were Marquis, Bluestem, Preston (Velvet Chaff), Royalton (red and white), and two durums. Minnesota lines showed 19 per cent increase in kernel weight when grown one year in Maine. No further increase was secured.—Preston kernels from Minnesota lines showed slight tendency to yellow berry while similar tendency in durum was very strong when grown under Maine conditions.—Variations in yield among various pure lines were rather marked.—Minnesota pure lines showed but slight loss in crude protein content, except durum lines which showed marked loss. Taking the 40 pure lines grown and analyzed in 1917 and 1918, the correlation coefficient of protein content was 0.381 ± 0.092 .—Certain Red-Fife lines gave satisfactory yields and best baking results. Preston and Bluestem lines gave reasonably good results. Marquis and Canada-Red lines were rather disappointing. Durum lines and certain unnamed ones were poorest.—*L. R. Waldron.*

HORTICULTURE

J. H. GOURLEY, *Editor*

H. E. KNOWLTON, *Assistant Editor*

(See also in this issue Entries 14, 213, 523, 526, 543, 577, 593, 601, 621, 659, 706, 707)

FRUITS AND GENERAL HORTICULTURE

356. ALLEN, W. J. An experiment with table grapes on sultana stock. *Agric. Gaz. New South Wales* 31: 600. 1920.—Judging by the yield, grafting trials showed that Corrichon and Ohanez vines do better by 50 per cent on their own stock than when grafted on sultana stock.—*L. R. Waldron.*

357. ALLEN, W. J., S. A. HOGG, AND W. LE GAY BRERETON. Orchard notes. *Agric. Gaz. New South Wales* 31: 599-600, 677-678, 748-750, 830-831, 898-900. 1920.—Practical suggestions of a timely nature are given upon care of orchards and products therefrom.—*L. R. Waldron.*

358. ANONYMOUS. Delmas pecan. *Amer. Nut Jour.* 12: 44. 1920.—The original Delmas pecan tree was grown from a nut planted by A. G. Delmas at Scranton, Mississippi, about 1877. The nut is large to very large in size, oblong ovate, has 4 conspicuous ridges, and is of good cracking quality. It has plump, straw colored kernels of rather soft texture and good quality.—*E. L. Overholser.*

359. ANONYMOUS. Fertilizing effects of sulphur on vines. *Cyprus Agric. Jour.* 15: 190-191. 1920.—This article is a summary of results secured by M. JEAN CHANZET, a French investigator, from an experiment undertaken to ascertain the action of sulphur upon the cultivation and yield of vines grown in the open. Two series of experiments were conducted, the 1st of which was designed to study the effect of sulphur without manure and the 2nd its effect with manure. The former gave an increase of over 25 per cent and the latter an increase of 27 per cent.—*W. Stuart.*

360. ANONYMOUS. Increasing leaf growth by perforating the root. *Sci. Amer. Monthly* 2: 14. 1920.—Experiments by MARIO CALVINO in Cuba are concerned, in which horizontal perforations of the primary root of cabbage, lettuce, parsley, etc., resulted in more luxurious development of the heads; and injections of nutritive solutions into the trunks of sterile pear trees caused them to bear again.—*Chas. H. Otis.*

361. ANONYMOUS. Largest and best equipped walnut packing house. Amer. Nut Jour. 13: 73. 1920.—The La Puente Valley Walnut Growers Association has established at La Puente, California, a walnut packing house three times as large as any other, and it has all modern facilities for grading, cleaning, and packing.—*E. L. Overholser.*

362. ANONYMOUS. Metodos de transplantar coqueiros. [Methods of transplanting coco-nuts.] Bol. Agric. Nova Goa [Portuguese East India] 1: 95-97. 1919. Popular.—*J. A. Stevenson.*

363. ANONYMOUS. One hundred million native pecan trees. Amer. Nut Jour. 12: 55. 1920.—BURBANK's statement is quoted in which the possibilities of pecan culture in the south, especially in Texas, are emphasized. Pecan trees make a prolific growth in western Texas and come into bearing the 1st or 2nd year after transplanting.—*E. L. Overholser.*

364. ANONYMOUS. The pruning and care of young apple trees. Better Fruit 15: 3-4. 1920.—Specific detailed directions are given for pruning from the time of planting to the bearing age. The protection of young trees from windstorms, snow, and ice is discussed.—*A. E. Murneck.*

365. ANONYMOUS. Spanish chestnuts. Cyprus Agric. Jour. 14, 15: 146-148. 1919, 1920.—The Agricultural Department of Cyprus since 1900 has distributed several thousand Spanish chestnuts free of charge to villagers in the hills. It has been found that most of the trees begin fruiting in the 4th year. A large well-grown tree is claimed to yield in a season fruit worth as much as £5.—*W. Stuart.*

366. ANONYMOUS. Wolford pecan. Amer. Nut Jour. 12: 44. 1920.—Propagation of this variety in localities other than McKinney, Texas, where it originated is recommended. The yield, very good quality, and excellent cracking quality compensate to a considerable extent for the medium, or slightly below medium, sized nuts and the fact that the tree is a rather slender grower.—*E. L. Overholser.*

367. ANONYMOUS. [Rev. of: FLETCHER, S. W. Strawberry growing. Rural Science Series. xxii + 325 p. New York: The Macmillan Company: New York, 1917.] Sci. Prog. [London] 14: 510. 1920.

368. BARKER, B. T. P. A survey of west of England farm orchards. Ann. Rept. Agric. and Hort. Res. Sta. Univ. Bristol 1919: 110-121. 1919.—Results are given of a study of orchard conditions in the Counties of Devon, Gloucester, Somerset, Wiltshire, and Worcester.—*W. H. Chandler.*

369. BARKER, B. T. P., AND A. H. LEES. Factors governing fruit-bud formation. II. The normal annual growth of the apple and pear. Ann. Rept. Agric. and Hort. Res. Sta. Univ. Bristol 1919: 85-92. 1919.—Results are given of observations and experimentation concerning the growth of the different buds on a twig. On a Vicar of Wakefield pear, buds had pushed out enough to be measured by March 14. Up to April 12 there was little difference in the amount of growth from the different buds, but after that time the terminal buds gained precedence. The author's results suggest that this difference among the buds is partially explained, but not entirely so, by the work of LOEB, according to which growth of the apical bud depresses the growth of buds back of it, either by the use of the available nutrients or by the formation of a substance that, moving backward, inhibits growth at the other buds. By examining the buds in winter and the same ones again when growth had started it was found that weak dormant buds produce weak growth in spring. The authors think that the growth of a bud is influenced by (a) temperature, (b) inhibition effect suggested by Loeb, (c) bud strength, (d) root action, (e) variety influence.—*W. H. Chandler.*

370. BARKER, B. T. P., AND A. H. LEES. Factors governing fruit-bud formation. III. The effect of notching and ringing on apple trees. Ann. Rept. Agric. and Hort. Res. Sta.

Univ. Bristol 1919: 93-98. 1919.—A general discussion is presented of the practises of ringing and notching with a preliminary report on some experiments. Rings of varying widths were made on main trunks and branches, and knife-edge rings on twigs. Ringing, if portions of bark were actually removed, caused the dormant buds below the ring to grow. More buds pushed out as a result of May ringing than as a result of July ringing. Knife-edge ringing on the twigs caused buds to grow into spurs or shoots on which the basal bud made the most growth. Notching above a bud caused the latter to make more growth than that made by similar buds not so notched. Notching below a bud keeps the latter dormant.—*W. H. Chandler.*

371. BARKER, B. T. P., AND G. T. SPINKS. Fruit breeding investigations. Ann. Rept. Agric. and Hort. Res. Sta. Univ. Bristol 1919: 76-84. 1919.—A statement of breeding work in progress with apples, plums, cherries, currants, gooseberries, raspberries, and strawberries.—*W. H. Chandler.*

372. BATCHELOR, L. D., AND D. C. WYLIE. Treating frosted trees. Amer. Nut Jour. 13: 14. 1920.—Trees not badly frosted should be cut back to good healthy tissues, allowed to grow, and the new growth thinned out in the fall. The same principle should be applied in the case of badly frosted trees. A good vigorous shoot below the frosted area is selected, and the tree cut back to about 1 inch above this shoot. All other shoots on the trunk are removed. Wounds are immediately sealed with a thick mixture of linseed oil and white lead. This mixture is preferred to the black asphaltum wound dressings.—*E. L. Overholser.*

373. BIXBY, W. C. Nut notes at Baldwin, New York. Amer. Nut Jour. 13: 12. 1920.—Observations made on specimens at the Arnold Arboretum showed that in some respects the shellbark is more closely akin to the pecan than to the hickories in spite of the great resemblance, in leaves and fruit, to the shagbark and mockernut. In case of northern varieties now propagated, no definite information is available as to whether they bear an abundance of both staminate and pistillate flowers, and whether or not the latter mature at the same time. Consequently, several varieties should be planted to insure good crops.—*E. L. Overholser.*

374. BIXBY, W. G. Propagated hickories. Amer. Nut Jour. 13: 70-71. 1920.—Experiences of nut growers in breeding and propagating the hickory are reviewed. The author concludes: “. . . am convinced that as soon as we can furnish the fine hickories we have in commercial quantities, they will command prices equal to those paid for the finest pecans.”—*E. L. Overholser.*

375. BÖRNER. Denkschrift zur Organization der Rebenzüchtung in Deutschland. [Memorial paper on the organization of vine breeding in Germany.] Mitteil. Deutsch. Landw. Ges. 35: 689-692. 1920.—The author outlines the problems, the methods of procedure, and gives an estimate of the cost of maintaining a selection garden. The total cost of this type of work in Germany is also estimated.—*A. J. Pieters.*

376. BULLARD, W. P. Pecan standards, brands and marketing. Amer. Nut Jour. 13: 34, 47. 1920.—The “Brand method” is claimed to be best. The advantages of a cooperative organization such as the National Pecan Growers’ Exchange are detailed.—*E. L. Overholser.*

377. CHEVALIER, A. Sur l’origine des pommiers à cidre cultivés en Normandie et en Bretagne. [The origin of cider apples cultivated in Normandy and Brittany.] Compt. Rend. Acad. Sci. Paris 171: 521-523. 1920.—The 500 to 1000 varieties of cider apples in northwest France yield a crop which in a good year is valued at 500 million francs. The history of apple culture in Normandy and Brittany is given. It is held that the varieties have arisen from the four elementary species of *Malus communis*, namely, *M. acerba*, *M. dasycphylla*, *M. praecox*, and *M. prunifolia*, either directly or through crosses with the small fruited varieties of Asia, such as *M. baccata*.—*C. H. Farr.*

378. COVILLE, FREDERICK V. The influence of cold in stimulating the growth of plants. Jour. Agric. Res. 22: 151-160. Pl. 20-35. 1920.—Such woody plants as the blueberry taken into a warm greenhouse in autumn refused to grow, although plants left out in the cold through the winter grew at once on being taken into such a greenhouse. A single freezing would not cause them to grow, but a prolonged chilling, even above the freezing point, would do so. When only a portion of the plant was chilled, that portion only started into growth on being brought into a warm room. The author thinks that "during the process of chilling the starch grains stored in the cells of the plant are at first separated by the living and active cell membranes from the enzyme that would transform the starch into sugar, but when the plant is chilled the vital activity of the cell membrane is weakened so that the enzyme 'leaks' through it, comes in contact with the starch, and turns it into sugar." He thinks that when the plant finally starts to grow without having been chilled the same principle applies, the membrane separating starch from the enzyme being weakened. The same principle is believed to apply when seeds are benefited by stratification.—*W. H. Chandler.*

379. DEMAREE, J. B. Some precautions in top-working pecan trees. Amer. Nut Jour. 13: 74. 1920.—Several reasons are given for preferring coal tar for sealing up wounds. An admixture of creosote is recommended because of its greater penetrating and antiseptic properties. Applications should be repeated after two or three months, and as frequently thereafter as may seem necessary.—*E. L. Overholser.*

380. DEMING, W. C. Plant black walnut. Amer. Nut Jour. 13: 10. 1920.—The author takes exception to BLEY's statement and advocates the planting of black walnut along roadsides.—*E. L. Overholser.*

381. EDWARDS, C. L. Selling standard pecans. Amer. Nut Jour. 12: 27. 1920.

382. EDWARDS, C. L. Transforming native to cultivated pecans in Texas. Amer. Nut Jour. 12: 9, 13. 1920.

383. FORKETT, C. Pecan breeding. Amer. Nut Jour. 12: 69. 1920.—A report on crossing Columbian, Success, Russel, Schley and Pabst varieties. Since most of the trees have not come into bearing no definite results are given.—*E. L. Overholser.*

384. GIMINGHAM, C. T., AND O. GROVE. Trial cider orchards. Ann. Rept. Agric. and Hort. Res. Sta. Univ. Bristol 1919: 99-109. 1919.—A description of conditions and treatments in some trial orchards in Devon, Gloucester, Monmouth, and Somerset Counties.—*W. H. Chandler.*

385. HOOVER, M. H. The farms by the side of the road. Amer. Nut Jour. 13: 38-39, 46. 1920.—Economic and conservation considerations emphasize the unrealized national asset of nut trees planted along roadsides.—*E. L. Overholser.*

386. HOWARD, H. L. More about root stocks. Monthly Bull. Dept. Agric. California 9: 93-95. 1920.—The French prune makes very poor union with the apricot root. Japanese pear stock is more resistant to pear blight than the French stock and successfully resists attack of woolly aphis. Some of the Siberian seedlings give great promise as regards blight resistance. By bench-grafting long scions of Surprise pear on Japanese roots the trunks and bases of main branches are obtained blight resistant.—*E. L. Overholser.*

387. ISBELL, C. L. Pecans on Piedmont soil in Alabama [U. S. A.]. Amer. Nut Jour. 13: 69. 1920.

388. JONES, J. F. Pecans, other than those of the well-known sections. Amer. Nut Jour. 12: 25, 30. 1920.—In its natural range the pecan is found farther north along the Mississippi in Iowa and Illinois than elsewhere in the U. S. A. Best varieties, like Marquardt and Witte,

were selected for northern propagation. Iowa has a climate which is colder than that of the same latitude farther east, and pecan trees there are hardier and have to mature fruit in a shorter season. These considerations are important in selecting varieties for northern planting.—*E. L. Overholser.*

389. LEWIS, C. I. Sites and soils for small fruits in the Northwest. *Better Fruit* 15⁵: 6, 17-18. 1920.—Adaptation of the various sections and localities of the Northwest to the commercial cultivation of the different varieties of small fruits is considered in detail. A rather heavy soil and fairly humid climatic conditions are of particular importance to the successful growing of almost all small fruits, the strawberry being a marked exception in this respect.—*A. E. Murneek.*

390. LITTLEPAGE, T. P. Black walnut for roadsides. *Amer. Nut Jour.* 13: 10. 1920.

391. LUCKS, R. Ueber die Zusammensetzung, insbesondere über den Stärkegehalt, einiger Reissgarten. [Concerning the composition, in particular the starch content, of certain kinds of prunings.] *Landw. Jahrb.* 35: 585-615. 1919.—The author calls attention to the possible value as fodder of the prunings from vines, fruit trees, and from certain shade trees. Twigs collected in December were studied with reference to general chemical composition, and microscopically to determine relative starch content and lignification of walls. The following species were used: *Acer platanoides*, *A. pseudoplatanus*, *A. negundo*, *Aesculus hippocastanum*, *Betula verrucosa*, *Populus virginiana*, *Pirus communis*, *P. malus*, *Tilia platyphyllos*, *Ulmus campestris*, and *Vitis vinifera*. The estimated starch content was least in *Betula verrucosa* and greatest in *Vitis vinifera*. The relative lignification of the cell walls was least in *Tilia platyphyllos* and greatest in *Ulmus*. The paper is accompanied by several plates showing photomicrographs of cross sections and starch grains in various species.—*A. J. Pieters.*

392. OWEN, T. F. Budded tree campaign in Texas. *Amer. Nut Jour.* 13: 7. 1920.

393. PATTERSON, J. H. Cost and development of pecan unit orchards. *Amer. Nut Jour.* 13: 36. 1920.—The ideal development of a pecan orchard requires rich soil enriched each year by ploughing under legumes. Under these conditions the orchard will yield a paying crop in 10 years.—*E. L. Overholser.*

394. PEARCY, K. Timely notes on Oregon nut growing. *Better Fruit* 15⁴: 12, 24. 1920.—A general discussion is presented on filbert growing in Oregon. Varietal differences are emphasized. Some of the main commercial varieties appear to be self-sterile. Investigations conducted at present by the Oregon Agric. Exp. Sta. may throw some light on the pollination problem in the filbert.—*A. E. Murneek.*

395. RAMSEY, F. T. Some of the older varieties of pecans of Texas origin. *Amer. Nut Jour.* 13: 67-68. 1920.—Reviews are presented of the important varieties, giving dominant characteristics. Instances are cited to show that varieties from the arid western regions when grown farther east under more humid atmospheric conditions decline, both as to health of the trees and size and plumpness of the nuts.—*E. L. Overholser.*

396. RASMUSSEN, P. M. Pecans in California. *Amer. Nut Jour.* 12: 30. 1920.—The best nuts of Fresno County are grown at Selma, which is also a promising district for the walnut and almond.—*E. L. Overholser.*

397. READ, F. W. The new shipping-point inspection service on fruits and vegetables. *Monthly Bull. Dept. Agric. California* 9: 371-374. 1920.—The inspection work is being undertaken by the Standardization Service at terminal marketing points. A certificate of inspection is issued which includes details of car storage and condition and quality of pack and fruit. The certificate is receivable as prima-facie evidence in the courts of the State.—*E. L. Overholser.*

398. REED, C. A. Pecan varieties, grades, standard and packages. Amer. Nut Jour. 12: 82, 93. 1920.
399. REED, C. A. The status of the American nut industry. Amer. Nut Jour. 12: 41. 1920.
400. RISIEN, E. E. Sovereign pecan. Amer. Nut Jour. 12: 44. 1920.—The variety was first named "Texas prolific" and later received its present name because of its high quality. The nut is large, oblong, generally symmetrical, bright red to reddish brown in color, and has a plump kernel of fine quality.—*E. L. Overholser.*
401. SALISBURY, E. J. [Rev. of: DUKE OF BEDFORD, AND SPENCER PICKERING. Science and fruit growing. xxi + 351 p., 4 pl., 47 fig. MacMillan & Co., Ltd.: London, 1919.] Sci. Prog. [London] 14: 506-507. 1920.
402. SEVIER, H. Almond growers' problem. Amer. Nut Jour. 12: 30. 1920.—The problem is the development of varieties blooming late enough to escape frost. At present the only important variety which blooms late is the Drake, and even this one is not late enough to escape all frosts.—*E. L. Overholser.*
403. SIMONDS, O. C. Nut trees in landscape work. Amer. Forestry 26: 618-621. 7 fig. 1920.
404. STICKEY, H. P. Varieties of pecans for Georgia. Amer. Nut Jour. 12: 12. 1920.—The varieties Alley, Moneymaker, Moore, Pabst, Stuart, Schley, and Teche are recommended on the basis of results obtained at the Georgia Agric. Exp. Sta. since 1908. Trees should be planted preferably 50-60 feet apart.—*E. L. Overholser.*
405. TAYLOR, R. H. The nut industry in the U. S. from a practical standpoint. Amer. Nut Jour. 12: 37-38. 1920.—At present commercial culture of the almond is limited largely to California, which produces 99 per cent of the total crop. Commercial production of walnuts in the U. S. A. is at present largely confined to the Pacific coast, in fact largely to California, which at present produces 96 per cent of the domestic product. Pecans, however, are best produced in the southern states.—*E. L. Overholser.*
406. WELDON, G. P. An old peach under a new name,—Ontario. Monthly Bull. Dept. Agric. California 9: 357-362. 1920.—The name Ontario has been substituted for Southern Tuscan. It is quite distinct from the northern variety, Tuskena. The Ontario is round rather flat variety, its leaf serration is more marked, a more regular bearer, has a smaller and more roundish pit with shallow convolutions, and is of much better quality than the Tuskena.—*E. L. Overholser.*
407. WHITTEN, J. C. Frost control and related factors. Monthly Bull. Dept. Agric. California 8: 675-678. 1919.
408. WHITTEN, J. C. Transplanting deciduous fruit trees. Monthly Bull. Dept. Agric. California 9: 73-75. 1920.
409. WITTE, O. F. Nut culture in Ohio. Amer. Nut Jour. 12: 7. 1920.
410. WYLIE, D. C. Heavy walnut planting. Amer. Nut Jour. 12: 77. 1920.—Shortage of nursery stock is attributed to abnormal conditions created during the war, and to the attempt of the producer to meet a large increased demand. The northern black walnut (*Juglans hindsii*) is considered the best stock for grafting. The author outlines the geographical distribution of the new walnut plantations.—*E. L. Overholser.*
411. YOUNG, F. D. Smoke and direct radiation in fruit protection. Better Fruit 15⁵: 5-6. 1920.—Reprint from California Citrograph 6: 6, 40. 1920.—*A. E. Murneek.*

FLORICULTURE AND ORNAMENTAL HORTICULTURE

412. ANONYMOUS. How spring flowers can bloom unharmed in spite of frosts. *Sci. Amer. Monthly* 2: 27. 1920.

413. ANONYMOUS. Rose cultivation and extraction of rose oil in Cyprus. *Cyprus Agric. Jour.* 15: 195-196. 1920.—At Milikouri, which is the principal rose growing village, the number of rose plants has doubled in the last 3 years and the industry is extending at Pedoulas, Kykko, and Chakistra. 3000 plants were grown by the students of the School Garden at Agros. Templos, Kyrenia, and Limassol are mentioned as newly developing centers.—*W. Stuart.*

414. WARD, E. N. The cultivation of flowers for profit. *Agric. Gaz. New South Wales* 31: 894. 1920.—General suggestions are given.—*L. R. Waldron.*

VEGETABLE CULTURE

415. ANONYMOUS. How to grow your own seed. *Cyprus Agric. Jour.* 15: 178-180. 1920.—Owing to the fact that there are no reliable seed growers in Cyprus and that imported seeds are not satisfactory due to not being acclimated, farmers and gardeners are advised to raise their own seed of such crops as beans, Indian corn, lettuces, melons, peas, cucumbers, spinach, and tomato. Recommendations are given for producing high grade seed.—*W. Stuart.*

416. ANONYMOUS. [Rev. of: BOYLE, J. G. *Vegetable growing. ix + 334 p., 154 fig.* Lea and Febiger: Philadelphia and New York, 1917.] *Sci. Prog. [London]* 14: 509-510. 1920.

417. COCKERELL, T. D. A. The Girasole or Jerusalem artichoke. *Monthly Bull. State Commission Hort. California* 8: 243-250. 1919.—The Girasole, *Helianthus tuberosus*, is a native of America, is tall, erect, and has an abundance of foliage and underground tubers. The latter mature in the fall, remain in the soil during winter unaffected by frost, and are good for domestic use and as animal feed. The tubers do not contain starch but instead inulin, which for assimilation requires hydrolysis. Artificial hydrolysis may prove practicable and desirable.—*E. L. Overholser.*

418. PEDERSEN, A. Almindelig dansk Gartnerforenings Planteavls-Udvalgs Beretning for 1919. [Danish Garden Union, report of experiments, 1919.] *Gartner-Tidende [København]* 36: 77-86. 1920.—Experiments are reported with cultivation of carrots and leeks, as well as investigations on varieties of tomatoes, peas, and beans best fitted for the country.—*Ernst Gram.*

419. REED, C. A. The American nut industry as a whole. *Amer. Nut Jour.* 12: 70-71. 1920.—In the U. S. A. there are five nut organizations, all striving to stimulate nut production and consumption. The author outlines the geographical distribution in the U. S. A. of walnuts, pecans, and almonds, and points out some important considerations in the production of nuts.—*E. L. Overholser.*

420. SCHLEINITZ, MARIE FREÜN VON. Über die Zusammensetzung von Gemüse Abfall. [Composition of vegetable waste.] *Landw. Jahrb.* 35: 781-807. 1919.—The author reports extensive studies on the proportions and chemical composition of edible matter and waste in various vegetables.—*A. J. Pieters.*

421. TEMPLE, C. E. Spacing tomato plants for field spraying. [Abstract.] *Phytopath.* 10: 59. 1920.

HORTICULTURE—PRODUCTS

422. ANONYMOUS. Charcoal from nut shells. *Amer. Nut Jour.* 12: 7. 1920.—The California Walnut Growers' Association has decided to proceed with the installation of equipment for making charcoal out of walnut shells from the cracking plants. Of all by-products suggested the charcoal seemed the most practicable to manufacture.—*E. L. Overholser.*

423. CHRISTIE, A. W. The University farm evaporator. *Monthly Bull. Dept. Agric. California* 9: 125-130. 1920.—A detailed description of the evaporator is followed by a report on investigations concerning temperature, humidity, and economy. The evaporator provides better sanitation and imparts a better quality to the product than when sun dried. It also reduces the risk from adverse weather conditions. Careful handling of the product is necessary where the temperature is allowed to go beyond 170° F. as chemical decomposition may result, especially if recirculation of the air is not provided for.—*E. L. Overholser.*

424. CRUESS, W. V. Discussion of fruit evaporation. *Monthly Bull. Dept. Agric. California* 8: 685-688. 1919.—Properly evaporated fruits are superior to the average sun-dried article in point of quality and sanitation. They also require less sulfuring and hence have a lower sulfuric acid content. Evaporation by the circulation of artificially heated air is an economy.—*E. L. Overholser.*

425. CRUESS, W. V. Types of evaporators. *Monthly Bull. Dept. Agric. California* 9: 104-113. 1920.—General principle involved in evaporation of fruit and vegetables is the utilization of the high water-absorbing capacity of hot, dry air. A rise in temperature of 27° F. doubles the water-absorbing capacity of the air. Recirculation of the spent air, besides being an economy, maintains the relative humidity within a desirable range. Fruit enters the evaporator at a moderate temperature, and as it dries higher temperatures can be used, thus lessening the danger of decomposing the fruit sugars. Evaporators are placed in three classes: (1) Natural draft evaporators; (2) forced draft evaporators; and (3) distillation types, including vacuum evaporators. In a vacuum drier the large reduction of oxygen and the lower temperature give a product unexcelled by other types of evaporators.—*E. L. Overholser.*

426. GROVE, OTTO. Cider making experiments for the season, 1918-19. *Ann. Rept. Agric. and Hort. Res. Sta. Univ. Bristol* 1919: 14-17. 1919.—This paper reports the results of experiments in making fermented cider from mixed apples and from single varieties, and in making perry. Analyses are given of the fresh cider and of the cider after a given amount of sugar had been added. The whole had been diluted with the second pressing from the pomace, to which water had been added. Specific gravity after fermentation and alcoholic content after one year in the bottle are given.—*W. H. Chandler.*

427. GROVE, OTTO. The relation between the rate of fermentation and the content of nitrogenous matter in apple juice. *Ann. Rept. Agric. and Hort. Res. Sta. Univ. Bristol* 1919: 20-22. 1919.—Samples of cider from 6 varieties were fermented and analyzed for nitrogen. Those containing 0.0221, 0.0135, 0.0146, and 0.0168 per cent of nitrogen fermented regularly until only a trace of sugar was left. That with 0.0033 per cent nitrogen fermented very slightly and 6.3 per cent of sugar was left. That containing 0.0094 per cent nitrogen fermented slowly and 1.04 per cent of sugar was left.—*W. H. Chandler.*

428. GROVE, OTTO. Some experiments on ropiness in cider. *Ann. Rept. Agric. and Hort. Res. Sta. Univ. Bristol* 1919: 18-19. 1919.—A bacillus capable of causing ropiness in cider had previously been isolated. Eight samples of cider were inoculated with this bacillus during the summer of 1917. By early summer, 1918, 5 of these samples had developed ropiness while no uninoculated samples had done so.—*W. H. Chandler.*

429. JAFFA, M. E. Standards for water content of dried fruits. *Monthly Bull. Dept. Agric. California* 9: 117. 1920.—The old limit of 27 per cent of water was higher than neces-

sary; 24 per cent should be the maximum allowed for any dried fruit. Interstate trade demands uniformity of laws regarding maximum water content of fruit products.—*E. L. Overholser*.

430. NICHOLS, P. F. A brief summary of activities of the U. S. Department of Agriculture in dehydration. Monthly Bull. Dept. Agric. California 9: 133-136. 1920.—The basic principle of dehydration is the reduction of moisture to a point where bacteria, yeasts, and molds, the chief agents of spoilage, are unable to grow. Starchy and sugary vegetables and fruits generally do not show spoilage until a moisture content of 25-30 per cent is reached. The optimum temperature for the spoilage organisms is 70-98° F.; some grow below 70 and few above 100° F. The Indian meal moth (*Plodia interpunctella*) is most common and destructive insect pest found in the dried products.—*E. L. Overholser*.

431. TUFTS, W. P. The Oregon tunnel evaporator. Monthly Bull. Dept. Agric. California 9: 131-133. 1920.—The temperature is allowed to rise gradually from 90 or 100 to 120 or 140° F., and the finishing temperatures vary from 160 to 185° F., the process generally requiring 24-36 hours. A strong objection to this type of drier is that the fruit can be examined only in the last stages of evaporation. However, it has been found that the circulation of air is such that fruit dries almost perfectly in proportion to the distance from the fire.—*E. L. Overholser*.

MORPHOLOGY, ANATOMY AND HISTOLOGY OF VASCULAR PLANTS

E. W. SINNOTT, *Editor*

(See also in this issue Entries 97, 391, 512, 573, 657, 688)

432. ANONYMOUS. [Rev. of BEAUVISAGE, L. Contribution à l'étude de la famille des Ternstroemiaceées. (Contribution to the anatomical study of the Ternstroemiaceae.) Thesis Doct. de Science, Poitier. 470 p., 229 fig. 1920.] Bull. Sci. Pharm. 27: 598-599. 1920.—The author examined more than 50 genera and found that 30 of these, generally accredited to the Ternstroemiaceae, do not actually belong to it. He believes that only *Ternstroemia*, *Adiandra*, *Schima*, *Haemocharis*, *Camellia*, *Thea*, and *Stewartia* belong to this family, and bases his opinion on an anatomical and morphological study of the plants. The general characteristics of these genera are: The flowers have 5 petals and 5 sepals, overlapping each other; numerous stamens, their meristems united with the corolla; a well developed cuticle; numerous calcium oxalate crystals; sclereids in the cortical parenchyma of the stem, in the pith, in the limb, in the sepals, in the petals, and in the pericarp. They differ from the Hypericaceae, Guttiferae, and Dipterocarpaceae in the absence of secretion channels.—*H. Engelhardt*.

433. ANONYMOUS. [Rev. of: CHAMBERLAIN, C. J. The living cycads. xiv + 172 p., 91 fig. University of Chicago Press: Chicago.] Sci. Prog. [London] 14: 507-508. 1920.

434. C., A. H. [Rev. of: ARBER, AGNES. Water plants, a study of aquatic angiosperms. 436 p., 172 fig. Cambridge Univ. Press: Cambridge, England, 1920.] Jour. Botany 58: 296-298. 1920.

435. CHIFFLOT, F. Sur les canaux sécréteurs gommifères des racines de Cycadacées, et plus particulièrement ceux du *Stangeria paradoxa* T. Moore. [On the latex ducts of the roots of cycads, and especially those of *Stangeria paradoxa*.] Compt. Rend. Acad. Sci. Paris 171: 257-258. 1920.—Twelve species of cycads representing 8 genera were studied and in only 1 case were laticiferous tubules found in all parts of the root. In this instance they did not occur in the very young rootlets and in the coralloid roots. The canals, whether they anastomose or not, are endocyclic. They are usually formed schizogenously, but in old roots may have a schizo-lysigenous origin.—*C. H. Farr*.

436. FRANGOS, G. Self-grafting by approach. *Cyprus Agric. Jour.* 14, 15: 145-146. 1919, 1920.—The union of 2 plants of *Phaseolus multiflorus* was observed by the author to have occurred some 2 feet above the ground, from which point they became joined together in 1 stem. One of the stems was cut off 3 inches below the point of union and it was found that the upper portion of the plant was able to draw its nourishment from the one on which it was self-grafted. The most interesting feature, however, was the putting forth of aerial roots at the point where the stem was cut off.—*W. Stuart.*

437. GRIER, N. M. Light correlated variations of the sterile stem of *Equisetum sylvaticum*. *Rhodora* 22: 165-167. 1920.—In a study of this species from a colony growing at Bellevue, Pennsylvania, the author makes comparisons between plants growing constantly well shaded and those receiving sunlight throughout the day. Correlation tabulations from 100 individuals of each habitat indicated that those growing in the sun had on the average a larger number of whorls to the stem, and more leaves to the particular whorl chosen for counting, and also that their stems were longer, or at least they had their whorls of leaves growing higher on the stem, than those from shady habitat.—*James P. Poole.*

438. HEUSSER, C. Over de voortplantingsorganen van *Hevea brasiliensis* Müll Arg. [The reproductive organs of *Hevea brasiliensis* Müll Arg.] Mededeel. Alg. Proefsta. A. V. R. O. S. [Medan, Sumatra] Rubberserie 24. 1919.—Reprint from Arch. Rubbercult. 3: 455-515. 1919.

439. LECOMTE, HENRI. Les canaux sécréteurs radiaux du bois. [The radial secretory canals in wood.] *Compt. Rend. Acad. Sci. Paris* 171: 533-536. 1920.—Radial secretory canals are present in *Pinus*, *Picea*, and *Larix*, but absent in 11 other genera of conifers. Six genera of the Anacardiaceae are found with them and 2 without. Their occurrence in the Burseraceae is problematical. In *Spondias* the radial canals are found to connect with the longitudinal canals of the secondary wood but not with those of the pith.—*C. H. Farr.*

440. MAAS, J. G. J. A. De bloembioologie van *Hevea brasiliensis*. [The floral biology of *Hevea brasiliensis*.] Mededeel. Alg. Proefsta. A. V. R. O. S. [Medan, Sumatra] Rubberserie 22. 1919.—Reprint from Arch. Rubbercult. 3: 288-312. 1919.

441. RESVOLL, THEKLA R. En utpaaget selvbestøver. [A distinctly self-pollinated plant.] *Nyt Mag. Naturvidenskab.* 56: 131-135. 4 fig. 1919.—Description of mode of self-pollination of *Epilobium anagallidifolium* Lam. by pressure of stamens against stigma.—*A. Gundersen.*

442. SALISBURY, E. J. Botany. *Sci. Prog.* [London] 14: 389-392, 572-575. 1920.—A brief review of some of the more important recent papers on anatomy, cytology, morphology, taxonomy, ecology and economic botany.—*J. L. Weimer.*

443. SOUEGÉS, RENÉ. Embryogénie des Composées. Les premiers stades du développement de l'embryon chez le *Senecio vulgaris* L. [The embryogeny of the Compositae. The first stages in the development of the embryo of *Senecio vulgaris*.] *Compt. Rend. Acad. Sci. Paris* 171: 254-256, 356-357. 13 fig. 1920.—The embryo of *Senecio* in its early stages of development resembles that of *Helianthus*. It is similar to other Compositae in the non-formation of octants and in the formation of the hypocotyl from the basal cell of the two celled embryo.—*C. H. Farr.*

444. WISSELINGH, C. VAN. Bijdragen tot de Kennis van de Zaadheid. Zesde bijdrage: Over de Zaadheid der Onagraceen en Lythraceen. [Contribution to a knowledge of the seed-coat. Sixth contribution: The seed-coat of the Onagraceae and Lythraceae.] *Pharm. Weekblad* 57: 77-83, 125-139. Pl. 1, 10 fig. 1920.—In the Onagraceae and Lythraceae the 2 integuments and the innermost integument and the nucellus at first are separated. In the Onagraceae, with the exception of *Epilobium angustifolium*, the cuticle generally disappears

during the development of the seed. In the Lythraceae, however, it remains. The cuticle between the 2 integuments and that between the seed-coat and the nucellus remain intact in both species. In the chalaza cork tissue is developed, which connects with the inner cuticle between the seed-coat and the nucellus. At times layers of the seed-coat develop into cork cells.—*H. Engelhardt.*

445. WISSELINGH, C. VAN. Bijdragen tot de Kennis van de Zaadhuid. Zevende bijdrage: Over de Zaadhuid van *Tropaeolum majus* L. (Tropaeolaceen), *Hypericum quadrangulum* L. (Hypericaceen) en *Ipomoea purpurea* Roth (Convolvulaceen). [Contributions to a knowledge of the seed coat. Seventh contribution: The seed coat of *Tropaeolum majus* L. (Tropaeolaceae), *Hypericum quadrangulum* L. (Hypericaceae) and *Ipomoea purpurea* Roth (Convolvulaceae).] Pharm. Weekblad 57: 575-583, 605-614. Pl. 2, 12 fig. 1920.—A survey of our knowledge, and particularly of the work of KAYSER, as to the morphological character of the seed coats in these 3 species. The presence in the young integument of cuticles which later disappear during the development of the ovule into the seed; and the history of the chalazal tissue, are especially studied. The author concludes that the chalaza should be regarded as a part of the seed coat.—*H. Engelhardt.*

MORPHOLOGY AND TAXONOMY OF ALGAE

E. N. TRANSEAU, *Editor*

(See in this issue Entries 99, 103, 687)

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

ALEXANDER W. EVANS, *Editor*

(See also in this issue Entries 118, 123, 130, 133, 134, 142, 687)

446. CAMPBELL, D. H. Studies in some East Indian Hepaticae. *Calobryum Blumei*, N. ab E. Ann. Botany 34: 1-12. Pl. 1, 6 fig. 1920.—*Calobryum* differs in several important particulars from the Jungermanniales, with which it is usually associated. The early stages of the antheridium and archegonium are very similar, supporting GOEBEL's theory of the close homologies of these organs. There is, however, considerable variation shown, especially by the antheridium. The genus is acrogynous, i.e., the apical cell finally becomes transformed into an archegonium. This organ has only 4 rows of peripheral neck-cells, and a cap-cell may be wanting. The sporophyte differs from that of the typical Jungermanniales in having but 1 layer of wall cells, thus more nearly resembling the Sphaerocarpales or Marchantiales. The family Calobryaceae is well founded, and perhaps a distinct order Calobryales ought to be established.—*D. H. Campbell.*

447. FLEISCHER, MAX. Kritische Revision von Carl Müllerschen Laubmoosgattungen. [Critical revision of Carl Müller's genera of mosses.] Hedwigia 61: 402-408. 1920.—This paper (which is to be continued) forms a part of a series in which the specimens contained in the herbarium of C. MÜLLER (of Halle) are critically discussed. It consists mostly of names arranged in 2 parallel columns, the first giving Müller's determinations and the second those of the author. Determinations which required neither revision nor transference to other genera are mostly omitted. The following genera, as understood by Müller, are taken up: *Braunia*, *Harrisonia*, *Hedwigia*, *Cyrtopus*, *Bescherellia*, *Spiridens*, *Trachypus*, *Myrinia*, *Mollirete*, *Eriodon*, *Dimerodontium*, *Rozea*, *Habrodon*, *Fabronia*, *Helicodontium*, and *Schwetschkea*. Several of Müller's species are reduced to synonymy, and many new combinations are necessitated through the transference of species.—*A. W. Evans.*

448. FLEISCHER, MAX. Natürliches System der Laubmoose. [Natural classification of the mosses.] Hedwigia 61: 390-400. 1920.—The classification here proposed is based on

characters drawn partly from the sporophyte and partly from the gametophyte. In the larger divisions the sporophytic characters are emphasized; in the smaller divisions, the gametophytic. The class Musci is first divided into the 3 subclasses Sphagnales, Andreaeales, and Bryales. The first 2 of these each include a single family, but the third is further divided into the 3 groups (Reihengruppen) Eubryinales, Buxbaumiinales, and Polytrichinales. Of these groups the first embraces the following orders (Reihen): Fissidentales (1 family), Dicranales (8 families), Pottiales (4 families), Grimmiales (1 family), Funariales (5 families), Schistostegiales (1 family), Tetraphidales (1 family), Eubryales (16 families), Isobryales (21 families), Hookeriales (6 families) and Hypnobryales (12 families). The second group embraces the orders Buxbaumiiales and Diphysciales (1 family each), and the third group the orders Dawsoniales and Polytrichales (1 family each).—A. W. Evans.

449. GARGEANNE, A. J. M. Über *Haplozia caespiticia* Dum. Recueil Trav. Bot. Néerland. 17: 205-217. 6 fig. 1920.—*Haplozia caespiticia*, a very rare species in the Netherlands, reaches its maximum development in late September and early October and is quickly overgrown by other bryophytes. It contains the largest oil-bodies heretofore observed in the Hepaticae. These are especially pronounced in the cells of the leaves, where they frequently take up the entire width of the cell. They occur also in the protonema but are minute or even lacking in the cells of the stem. *Haplozia caespiticia* is one of the very few Jungermanniales which produce endogenous gemmae. These are borne in hundreds at the apexes of the stem and also on the protonema; they are set free by the gelatinization of the cell walls. When germinated on peat under glass the gemmae give rise to orthotropous shoots with bilobed or even serrate leaves, instead of the roundish leaves normal to the species.—J. C. Th. Uphof.

450. LESAGE, P. Contributions à l'étude de la germination des spores de mousses. [Germination of moss spores.] Compt. Rend. Acad. Sci. Paris 166: 744-747. 1918.—See Bot. Absts. 7, Entry 433.

451. LORCH, WILHELM. Die Haube von *Polytrichum formosum* Hedw. [The calyptra of *Polytrichum formosum*.] Hedwigia 61: 346-347. 1920.—The author shows that the operculum of *Polytrichum formosum* remains closely attached to the calyptra and that both organs are thrown off simultaneously. He considers that the calyptra, thus acting as a sort of "flight organ," plays an important part in the separation of the operculum, in addition to carrying out its function of protecting the developing capsule.—A. W. Evans.

452. MACHADO, A. Notes de bryologie portugaise. [Notes on Portuguese mosses.] Bull. Soc. Portugaise Sci. Nat. 8: 43-45. 1918.—In the first part of the paper 4 mosses new to the flora of Portugal are recorded, 1 species being described as new under the name *Pottia Samfaiana*. It approaches *P. cavifolia*, var. *epilosa* Schp. and was discovered by G. SAMFAIO in the province of Algarve. In the second part of the paper the opinion is advanced that *Hypnum lusitanicum* Schp. represents an aberrant form of *Rhynchostegium rusciforme* Br. & Schp.—A. W. Evans.

453. MALTA, N. Beiträge zur Moosflora des Gouvernements Pleskau mit besonderer Berücksichtigung des Kalksteingebietes der Welikajamündung. [Contributions to the moss flora of the Government Pskov, with special reference to the limestone region at the mouth of the Velikaia River.] 78 p., 12 fig. Riga, 1919.—This report on the bryophytes of the Government Pskov in western Russia is based on observations and collections made by the author during the years 1916 and 1917. The species occurring on limestone, on sandstone, and on clayey substrata are separately discussed, and the influences exerted on the bryophytic flora by the physical and chemical factors of the soil are clearly indicated. In the enumeration of species which concludes the work 35 hepatics, 15 peat mosses, and 206 mosses are listed with definite data regarding stations. The only new species proposed is *Bryum androgynum* Warnst., but a new var. *pleskowiensis* Malta is described under *Seligeria recurvata*. The new species and the new variety are illustrated.—A. W. Evans.

454. SØRENSEN, S. *Pterigynandrum filiforme* (Timm) Hedw. og dens vegetative formeringsformer. [Pterigynandrum filiforme and its forms of vegetative multiplication.] *Nyt Mag. Naturvidenskab.* 56: 137-148. 1 pl., 2 fig., 1 map. 1919.—The author describes propagation by gonidia and by vegetative branching in *Pterigynandrum filiforme*. His observations are based on field and herbarium studies and on experiments.—A. Gundersen.

455. WARNSTORF, C. Bemerkungen zu *Androcryphia confluens* (Tayl.) Nees in Synops. Hep. S. 471 (1844). [Remarks on *Androcryphia confluens*.] *Hedwigia* 61: 343-345. 1920.—The author's observations are based on material collected by HERZOG in the Andes of Bolivia and determined by STEPHANI as *Androcryphia confluens*. In some of the specimens he finds purplish red rhizoids, which are not supposed to occur in the genus. He comments on the systematic position of *Androcryphia* and calls attention to the fact that Stephani makes no mention of it in his published account of Herzog's Hepaticae.—A. W. Evans.

MORPHOLOGY AND TAXONOMY OF FUNGI, LICHENS, BACTERIA AND MYXOMYCETES

H. M. FITZPATRICK, *Editor*

(See also in this issue Entries 108, 128, 234, 519, 521, 661, 687)

FUNGI

456. ADAMS, J. F. *Darluka* on *Peridermium Peckii*. *Mycologia* 12: 309-314. Pl. 21. 1920.—*Darluka filum* (Biv.) Cast., parasitizing various rusts and various rust forms, including pycnia and aecia is described in detail.—H. R. Rosen.

457. ANONYMOUS. Index to American mycological literature. *Mycologia* 12: 343-346. 1920.

458. ANONYMOUS. [Rev. of: OLIVER, WADE W. Cultural studies in a case of sprue. *Jour. Amer. Med. Assoc.* 74: 27-28. 1920.] *Jour. Tropic. Med. and Hygiene* 23: 50. 1920.—From the stool, sputum, tongue, etc., was isolated a species of *Monilia* growing as a yeast. Intra-peritoneal injection into a guinea pig resulted fatally in 7 days. The fungus was reisolated from the liver and gall bladder.—E. A. Bessey.

459. BEER, RUDOLPH. On a new species of *Melanotaenium* with a general account of the genus. *Trans. British Mycol. Soc.* 6: 331-343. Pl. 8. 1920.—A species of *Melanotaenium* was found to be the cause of tumour-like swellings on the subterranean stems and leaf-structures of *Lamium album*. The fungus is described and named *M. Lamii*. A study of the cytology of the fungus shows that the hyphal cells are binucleate and the mature spores uninucleate.—W. B. McDougall.

460. BUCKLEY, W. D. A new *Discinella*. *Trans. British Mycol. Soc.* 6: 346-347. 1920.—*Discinella margarita* is described as new.—W. B. McDougall.

461. BURT, EDWARD ANGUS. The Thelephoraceae of North America. XII. *Stereum*. *Ann. Missouri Bot. Gard.* 7: 81-248. Pl. 2-6, fig. 1-48. 1920.—In this continuation of the monograph of the Thelephoraceae of North America, Burt presents a comprehensive taxonomic account of the genus *Stereum*. The treatment of this large genus of 77 accepted species includes an elaborate key to the species and under each of the American species discussed there are given the synonymy and references to literature, full diagnoses, notes on occurrence, habits, peculiarities, and citations of specimens examined. The species are arranged in sections as central-stemmed, lateral-stemmed, merismatoid, and dimidiate and effuso-reflexed species. Burt finds the difficulties of identification, experienced by many workers, greatly decreased after a thorough study and analysis of the microscopically recognizable organs or combinations of organs. Among the North American species referred to, 12 are new and 5 are newly combined. The new species

are *Stereum caespitosum*, *S. saxitias*, *S. pubescens*, *S. conicum*, *S. patelliforme*, *S. Earlei*, *S. magnisporum*, *S. spumeum*, *S. erumpens*, *S. sepium*, *S. heterosporum*, and *S. durum*. Among the new combinations *S. exiguum*, *S. radicans*, *S. craspedium*, and *S. Murrayi* were transferred from the genus *Thelephora*, and *Stereum rugisporum* from *Hymenochaete*. In addition, notes are recorded on 10 imperfectly known species and 20 excluded from the genus. Among the latter *Stereum subcruentatum* Berk. & Curtis becomes "*Aleurodiscus subcruentatus* (B. & C.) Burt, n. comb.; now included among American species, because of collections received from California and Oregon."—*S. M. Zeller*.

462. CHARDON, CARLOS E. A list of the Pyrenomycetes of Porto Rico collected by H. H. Whetzel and E. W. Olive. *Mycologia* 12: 316-321. 1920.—Sixty-five species are listed, the genera *Meliola* and *Phyllachora* being best represented.—*H. R. Rosen*.

463. ELLIOTT, JESSIE S. BAYLISS, AND HELENA C. CHANCE. The conidia and paraphyses of *Pezicula eucrita* Karst. *Trans. British Mycol. Soc.* 6: 353-354. 1 fig. 1920.—The ascospores of this fungus are not readily discharged from the asci but they germinate, often within the asci, and produce conidia very abundantly.—*W. B. McDougall*.

464. JOHNSON, MARIE E. M. On the biology of *Panus stypticus*. *Trans. British Mycol. Soc.* 6: 348-352. Pl. 9. 1920.—The sporophores of this fungus are not able to grow in the smoky atmosphere in the vicinity of iron and chemical works nor in the absence of light. They are not affected by frost and are very xerophytic. The mycelium likewise can be dried for many months and still retain its vitality.—*W. B. McDougall*.

465. JONES, FRED RUEL, AND CHARLES DRECHSLER. The development of *Urophlyctis alfae*. [Abstract.] *Phytopath.* 10: 65. 1920.

466. MURRILL, WILLIAM A. Light-colored resupinate polypores—II. *Mycologia* 12: 299-308. 1920.—Descriptive notes of 20 species of *Poria* are given. The following are the new species described: *P. linearis*, *P. hondurensis*, *P. Johnstonii*, *P. salicina*, *P. perextensa*, *P. hymeniacola*, *P. separans*, *P. roseitingens*, *P. Cokeri*, *P. distorta*, *P. submollusca*, *P. lignicola*, *P. montana*, and *P. arachnoidea*.—*H. R. Rosen*.

467. MURRILL, W. A. The fungi of Blacksburg, Virginia. *Mycologia* 12: 322-328. 1920.—More than 150 species of fungi are listed, most of them being fleshy forms. *Pluteus praerugosus* is described as a new species.—*H. R. Rosen*.

468. PAUL, DAVID. Note on *Marasmius Caulicinalis* (With.) Fr. *Trans. British Mycol. Soc.* 6: 344-345. 1920.—After discussing the orthography and history of the specific name the author concludes that the original spelling, *caulicinalis*, should be restored.—*W. B. McDougall*.

469. REA, CARLETON. New or rare British fungi. *Trans. British Mycol. Soc.* 6: 322-330. Pl. 7. 1920.—The following species and one variety are described as new: *Mycena atrovirens*, *Marasmius obtusifolius*, *Pluteus phlebophorus* (Dittm.) Fr. var. *albofarinosa*, *Nolanea strigosissima*, *Astrosporina fulva*, and *Urceolella Iridis*.—*W. B. McDougall*.

470. SMITH, A. LORRAIN, AND J. RAMSBOTTOM. New or rare microfungi. *Trans. British Mycol. Soc.* 6: 365-374. 1920.—*Lophodermium lineatum* is described as new.—*W. B. McDougall*.

471. TANAKA, TYÔZABURÔ. New Japanese fungi—Notes and translations—IX. *Mycologia* 12: 329-333. 1920.—The following fungi are described: *Helminthosporium papaveri* K. Sawada sp. nov., parasitic on *Papaver somniferum* in Formosa, *Fusicladium theae* K. Hara sp. nov., on leaves of *Thea sinensis*, *Mycosphaerella theae* K. Hara sp. nov., parasitic on leaves of *Thea sinensis*, *Mycosphaerella Ikedai* K. Hara sp. nov., saprophytic on leaves of *Thea sinensis*, *Meliola citricola* K. Hara sp. nov., epiphytic on leaves, branches, and fruits of *Citrus* spp., and *Gloeosporium Cartharni* Hori and Hemmi comb. nov.—*H. R. Rosen*.

472. WAKEFIELD, E. M. *Galactinia amethystina* (Phill.) Wakef. Trans. British Mycol. Soc. 6: 375. 1920.—This is the plant formerly called *Galactinia Phillipsii* (Cke.) Boud., or, still earlier, *Ascobolus amethystinus* Phill.—W. B. McDougall.

473. WAKEFIELD, E. M. The Painswick Foray. Trans. British Mycol. Soc. 6: 299-302. 1920.—The Spring Foray, which was held at Painswick, Gloucestershire, from May 21 to May 25, 1920, is described and a complete list of the fungi collected, numbering about 125 species, is given.—W. B. McDougall.

474. WAKEFIELD, E. M., AND A. A. PEARSON. Records of Surrey resupinate Hymenomycetes. Trans. British Mycol. Soc. 6: 317-321. 6 fig. 1920.—Sixteen species are listed, in most cases with descriptive notes.—W. B. McDougall.

475. WILTSHIRE, S. P. The production of conidia in pure cultures by the brown rot fungus of the apple. Ann. Rept. Agric. and Hort. Res. Sta. Univ. Bristol 1919: 34-36. 1919.—Attempts to secure abundant production of conidia by *Sclerotinia fructigena* in pure culture are reported. Varieties of apples supposed to develop upon inoculation brown rot and abundant conidia, instead of black rot and no conidia, failed to do so.—The best medium found for production of conidia is sliced potato soaked in 7.5 per cent malic acid. Plum wood extract with 1 per cent malic acid also gives excellent production of conidia.—D. Reddick.

476. YORK, H. H. Late seasonal production of aecia of *Cronartium ribicola*. Phytopath. 10: 111. 1920.—Freshly matured aecia were found on *Pinus strobus*, on Sept. 16, 1919.—D. Reddick.

LICHENS

477. CHURCH, A. H. The lichen symbiosis. Jour. Botany 58: 213-219, 262-267. 1920.—The generally accepted teaching is that lichens consist of a fungus and an alga living very closely together in symbiotic relationship, the whole forming a "consortium." The difficulty of convincing a student that in lichens any symbiotic relation exists is noted. To determine whether mutual benefit occurs in all cases is difficult; also the consortium is ill-defined, especially in cases of symbiosis of fungi with filamentous algae and higher plants where there is a complete gradation to purely parasitic conditions. The fungi are always normal ascomycetes or basidiomycetes, and have not been modified by the association. It is the vegetative part or thallus that has been so remarkably modified by the cohabitation. The important factor is *dual control*. Simple cohabitation is not the sole factor in the consortium. Dual control is a biological futility like a house divided against itself, and, hence, doomed to rapid extinction. The alga gains little if anything from the association with the fungus. The views held by SACHS, WEST, SCHENK, and GOEBEL are discussed, it being noted that much in their statements is deductive rather than inductive. The relation of the whole question of the evolution of dorsi-ventral organs, or even axial structure, through the enormously long period of emergence from the phytobenthon of the sea is noted. Yet there is something about lichens, neither fungus nor alga, but a form factor, which produces a soma readily distinguished by the collector, and the cause of which must be found and explained. There is nothing in symbiosis to show why *Cladonia* should have a centric habit and *Parmelia* a dorsiventral habit in the same environment. Any effect of symbiosis in this matter is doubted, and the relation of lichen form to alga form is pointed out. REINKE held that the similarity of form in distinct phyla as in lichens and algae was due to the effect of similar conditions; but the conditions surrounding sea-weeds and lichens are not similar. The question is raised whether lichens, or rather the fungus part of lichens, do not actually inherit their form from algae. Lichens would thus represent a deteriorating race of algae arrested in deterioration by the intrusion of algal units of a lower degree.—K. M. Wiegand.

478. LYNGE, B. Index specierum et varietatum Lichenum quae collectonibus "Lichenes exsiccati" distributae sunt. (Forts.) [Index of species and varieties of Lichenes which were distributed in the collections of "Lichenes exsiccati." (Continued.)] Nyt. Mag. Naturvidenskab. 56: 385-464. 1919.

479. MERESCHKOVSKY, C. On some new forms of lichens. *Ann. and Mag. Nat. Hist.* 6: 482-489. 1920.—The author gives a brief description in Latin followed by one in French of the following forms of lichens: *Physcia pulverulenta*, formae *delicata*, *turgidula*, and *elegantella*, and varieties *lepidota*, *aquiloides*, and *angustata*. *Physcia virella*, formae *dendrilobata*, and *dendrilobata subforma tenerrima*. *Physcia hispida*, forma *auriculata*. *Squamaria muralis*, formae *convexiuscula* and *granulata*, and var. *flexuosa*. *Parmelia conspersa*, forma *dispersa*, and varieties *diffRACTA*, *digitulata* forma *intermedia*, and *isidiata* forma *heteroclyta*. *Anaptychia ciliaris*, formae *helianthus* and *submarginata*. *Cetraria hiascens*, forma *delicatula*. *Caloplaca teicholyta*, forma *nivalis*. *Dermatocarpon aquaticum*, var. *nervosum*. *Biatora kreyeri*.—H. H. Clum.

480. PAULSON, ROBERT. Lichens found near Painswick. *Trans. British Mycol. Soc.* 6: 303-304. 1920.—A list is given of about 45 species of lichens collected near Painswick, Gloucestershire, during the Spring Foray of May, 1920, together with brief notes on habitat relations.—W. B. McDougall.

BACTERIA

481. ANONYMOUS. The rate of speed at which bacteria travel. *Sci. Amer.* 123: 441. 1920.

482. WOLF, F. A. A bacterial leafspot of velvet bean. *Phytopath.* 10: 73-80. 2 fig. 1920.—A description of a hitherto undescribed leafspot disease of Florida velvet beans caused by *Aplanobacter stizolobii* n. sp.—J. G. Dickson.

MYXOMYCETES

483. CURRIE, MARY E. A critical study of the slime-molds of Ontario. *Trans. Roy. Canadian Inst.* 12: 247-308. Pl. 8-10. 1920.—Of the 28 genera and 110 species and varieties reported from Ontario, 47 species and varieties are here recorded from Ontario for the first time, 36 of them being new to Canada. Three species and 1 variety are reported as new to North America, viz., *Badhamia foliicola* Lister, *Diachaea bulbilosa* Lister, *Stemonitis fusca* Roth. var. *confluens* Lister, and *Stemonitis flavogenita* Jahn. The plasmodia of 2 species have been noted for the first time. Five forms have been observed parasitizing fungi and 9 have been found fruiting on, and in some cases causing injury to, the leaves or stems of herbaceous plants.—R. B. Thomson.

PALEOBOTANY AND EVOLUTIONARY HISTORY

E. W. BERRY, *Editor*

(See also in this issue Entries 704, 705)

484. ANONYMOUS. Contemporaneous evolution of warm-blooded animals and of flowering plants. [Rev. of: BERRY, E. W. Evolution of flowering plants and warm-blooded animals. *Amer. Jour. Sci.* 49: 207-211. 1920.] *Sci. Amer. Monthly* 1: 558-559. 1920.

485. CARPENTIER, ALFRED. Sur quelques végétaux silicifiés des environs de Sainte-Marie-aux-Mines [Alsace]. [On some silicified plant remains in the region of Sainte-Marie-aux-Mines.] *Compt. Rend. Acad. Sci. Paris* 171: 250-252. 1920.—The rocks of this region are found to contain roots of *Psaronius*, sporanges of *Pteridotheca*, petioles of *Medullosa*, pollen of *Cordaites* and other gymnosperms, and leaves of the Cordaitales.—C. H. Farr.

486. CLARKE, J. M. The oldest of the forests. *Sci. Monthly* 12: 83-91. 6 fig. 1921.—Devonian conditions were not favorable for preserving trees. But trees, mostly fern-like, were not sparse and scattered. Until recently the richness of the Catskill hills in the relics of the Devonian forests has not been realized. An expedition this year brought 5000 pounds

of their remains for museum purposes.—A great autumn freshet of the upper Schoharie in 1869 revealed in the bed rock of the hills a series of standing stumps of trees all at the same level in the rocks and their rootlets in the original mud, now shale, thus revealing the most ancient forest yet known. These trees are preserved at least at two levels in the rock, one 60 feet above the other.—*L. Pace.*

487. HOLTENDAHL, O. Occurrence of structures like Walcott's Algonkian Algae in the Permian of England. *Amer. Jour. Sci.* 1: 195-206. *Fig. 1-8.* 1921.—Forms from the English Permian are described and illustrated that greatly resemble the Algonkian forms called *Newlandia* and *Greysonia* by Walcott, and that are considered as in all probability secondary structures and not of organic origin.—*E. W. Berry.*

488. KRÄUSEL, R. Die fossilen Koniferenhölze (unter Ausschluss von Araucarioxylon Kraus). Versuch einer monographischen Darstellung. [Attempt at a monographic treatment of fossil coniferous wood, exclusive of Araucarioxylon.] *Palaeontographica* 62: 185-275. 1919.—A monographic treatment of fossil coniferous woods, giving besides an alphabetic list of the hitherto described species (with bibliographic references, synonymy, and horizons); also a historical introductory section and a systematic synopsis of the recognizable forms (with corresponding existing forms, horizons, and localities). The author dissents from JEFFREY's view of the relationships among the coniferous families, and on the basis of histologic studies by himself and other students, holds that the Araucariaceae are the older and the Abietineaceae the younger groups. The bibliography comprises 243 titles.—*Saml. W. Geiser.*

489. KRÄUSEL, R. Palaeobotanische Notizen. *Senckenbergiana* 2: 198-215. 1920.—This communication comprises three parts. The first, p. 198-204, consists of additions to this author's recently published monograph on fossil coniferous woods (see Bot. Absts. 8, Entry 488). The second, "Zur Bestimmung fossiler Koniferenhölzer" [The determination of fossil coniferous woods], is a 4 page summary of current ideas. The third, "Über die Lignite von Senftenberg [Upon the lignite of Senftenberg], gives the results of a study of the wood structures from this Miocene horizon which is widespread in Saxony, Silesia, Mecklenburg, Mark Brandenburg, etc. The author determined the percentage representation of *Taxodium* and *Sequoia* in the lower, middle, and upper parts of the lignite in the various mines at Senftenberg, and discusses the probable ecology.—*E. W. Berry.*

490. KRAUSEL, R. Nachträge zur Tertiärflora Schlesiens. III. Über einige Originale Goepperts und neuere Funde. [Additions to the Tertiary flora of Silesia. III. Upon some of Goeppert's types and new collections.] *Jahrb. Preuss. Geol. Landes.* 40: 363-433. *Pl. 5-15.* 1920.—This paper concerns itself with Goeppert's types and with new collections from Ruppertsdorf, Peruschen, Oppatowitz, and Bluschau. No new forms are described but the older determinations are revised. Species in the following genera are discussed: *Woodwardia*, *Pteris* (2), *Salvinia*, *Pinus*, *Taxodium*, *Glyptostrobus*, *Sequoia*, *Taxodioxylon*, *Libocedrus*, *Widdringtonia*, *Salix* (2), *Populus* (2), *Myrica*, *Juglans* (3), *Hicoria*, *Pterocarya*, *Carpinus*, *Betula* (2), *Castanea*, *Quercus*, *Ulmus* (2), *Zelkova*, *Cinnamomum*, *Persea*, *Philadelphus*, *Liquidambar*, *Platanus*, *Crataegus*, *Rhus*, *Acer* (4), *Palivurus*, *Vitis*, *Grewia*, *Buettneria*, *Cornus*, and several undetermined types. All are of Miocene age, those from Bluschau and Oppatowitz being regarded as older than Schosnitz (Tortonian) and those from Peruscher being regarded as younger (presumably Sarmatian).—*E. W. Berry.*

491. LOZANO, E. D. Depositos diatomiferos en el valle de Toxi, Ixtlahuaca, Estado de Mexico. [The diatomaceous deposits of the Toxi Valley, Mexico.] *An. Inst. Geol. Mexico* 9: 1-19. *Pl. 1-5.* 1920.—The author describes the diatomaceous deposits of the valley of Toxi and records and figures diatoms representing the genera *Synedra*, *Surirella*, *Coscinodiscus*, *Cyclotella*, *Gaillonella*, *Encyonema*, *Epithemia*, *Navicula*, and *Pleurosigma*. The deposits were laid down subsequent to the volcanic rocks of the region and are considered of fresh water origin and Pleistocene age.—*E. W. Berry.*

492. REID, E. M. Recherches sur quelques graines pliocènes du Pont-de-Gail (Cantal). [Studies of Pliocene seeds from Pont-de-Gail, Cantal.] Bull. Soc. Géol. France IV, 20: 48-87. Pl. 3-4. 1920.—Total number of varieties reported is 48 of which 37 are positively determined and 17 of these are new and include species of *Sparganium*, *Stratiotes*, *Carpinus*, *Fagopyrum*, *Ranunculus*, *Menispermum*, *Polanisia*, *Myriophyllum*, *Symplocos*, *Lycopus*, *Sambucus*, *Trichosanthes* and a new genus, *Diclidocarya*, of unknown botanical affinity and also present in the Pliocene of Holland. The age is considered to be lower Pliocene and the flora contains a large exotic and extinct element with a pronounced southeastern Asiatic and North American facies. There is an elaborate discussion, the gist of which has already been given in the abstract of this author's subsequently published paper on Pliocene floras. A complete bibliography and two plates complete the paper.—E. W. Berry.

493. REID, E. M. Recherches sur quelques graines pliocènes de Pont-de-Gail (Cantal). [A study of the Pliocene seeds of Pont-de-Gail.] Compt. Rend. Sommaire Soc. Geol. France 6: 49-51. 1920.—Seeds of 48 species of plants from the lower Pliocene of Central France are recorded. Of these, 18 are new and 5 are exotics now dwelling in southeastern Asia. A detailed account is promised in a future publication.—E. W. Berry.

494. STOPES, M. C. Paleobotany in 1918. Sci. Prog. [London] 14: 396-398. 1920.—A brief review of the most important papers published in this field during 1918.—J. L. Weimer.

495. THIESSEN, R. Structure in Paleozoic bituminous coals. U. S. Bur. Mines Bull. 117. 296 p., 160 pl. 1920.—This paper gives the results of several years study of coal structures. A historical summary is followed by an account of the methods of study. The origin and structure of modern peat is discussed and it is shown that coal had a similar origin and shows comparable structure and plant content. The coals described in detail comprise samples from Pennsylvania, West Virginia, Indiana, Illinois, Iowa, and Alabama, all from bituminous mines and of Carboniferous age. Coal is shown to consist of the three elements long recognized, namely, the charcoal, or "mother of coal," and compact coal, the latter consisting of alternating laminae of dull coal (matt, canneloid, sapanthrakon) and bright bands (glanz, humus, jet, carbohumins, lignitoid, hydrocarbon), the anthraxylon of the author. The dull laminae are shown to be made up of former woody parts in a more finely divided state than in the bright bands and imbedded in a ground mass of finely divided debris which the author calls the *attritus*. The *attritus* consists chiefly of woody degradation products along with traces of cuticles, spore and pollen exines, and resinous particles of various origins. The bright laminae are shown to consist largely of small chips of semi-decayed woody tissues. Many plant fragments of various plant parts and a variety of exines are discussed and figured but no attempt is made to assign names to any of them except a *Medullosa* stem, which is identified as *Medullosa anglica*. The report is profusely illustrated.—E. W. Berry.

PATHOLOGY

G. H. COONS, *Editor*

C. W. BENNETT, *Assistant Editor*

(See also in this issue Entries 8, 15, 25, 54, 158, 173, 181, 386, 397, 456, 459, 475, 476, 482, 483, 611, 612, 675, 678, 682, 688)

PLANT DISEASE SURVEY; REPORTS OF DISEASE OCCURRENCE AND SEVERITY

496. ANONYMOUS. Chemistry in plant distribution. Sci. Amer. Monthly 1: 562-563. 1920.—The use of methyl red to indicate whether or not a soil is sufficiently acid to grow scab-free potatoes is explained.—Chas. H. Otis.

497. ARTHUR, J. C. Two destructive rusts ready to invade the United States. [Abstract.] Phytopath. 10: 65-66. 1920.

498. GRAVATT, G. F. The chestnut blight in the southern Appalachians. *Amer. Forestry* 26: 606-607. 1920.—It is predicted that the chestnut growth of the southern Appalachians will be killed off just as the growth from New York south to southern Virginia is being killed.—*Chas. H. Otis*.

499. JOHNSON, A. G., J. G. DICKSON, AND HELEN JOHANN. An epidemic of *Fusarium* blight (scab) of wheat and other cereals. [Abstract.] *Phytopath.* 10: 51. 1920.

500. LYMAN, G. R. The 1919 survey for potato wart. [Abstract.] *Phytopath.* 10: 60-61. 1920

501. STEVENS, F. L. Foot-rot of wheat and its fungous associates. [Abstract.] *Phytopath.* 10: 52. 1920.

THE HOST (RESISTANCE, SUSCEPTIBILITY, MORBID ANATOMY AND PHYSIOLOGY)

502. ANONYMOUS. *Bladrulesyge hos Tomater*. [Leaf-roll of tomatoes.] *Gartner-Tidende* [København] 36: 123. 1920.—The rolling of the leaves often seen in tomatoes cannot be compared to the leaf-roll of potatoes, but is a reaction following heavy pruning. Individual plants or certain forms may be more inclined to roll than others.—*Ernst Gram*.

503. FRANGOS, G. A vine plant immune to *Oidium*. *Cyprus Agric. Jour.* 15: 146. 1920.—A vine plant on the Heloan Farm at Alethrico was observed in August, 1919, to be quite free from mildew (*Uncinula necator*) while all the others were badly affected. Inquiry regarding the source of this vine revealed the fact that it had been obtained from Ayios Ambrosios and was known as "Laorcas." It is proposed to test thoroughly the persistency of immunity of the vine to *Oidium*.—*W. Stuart*.

504. FROMME, F. D. The development of loose smut of wheat as modified by soil fertility. [Abstract.] *Phytopath.* 10: 53. 1920.

505. HODSON, E. R. Is American chestnut developing immunity to the blight? *Jour. Forestry* 18: 693-700. 1920.—The chestnut blight does not appear controllable by ordinary methods but observations appear to show that immunity is developing or that individuals are resistant. As the chestnut sprouts at the base, the organism may live for two or three decades and in this period immunity, which is the only hope for forest stands, may actually develop. Two types of canker are recognized, atrophy, a depressed surface, and hypertrophy, a swollen distorted condition. In the first the plant makes no resistance to the disease, while in the second there is resistance to the invader. Immunity development requires time, of which the apparent recovery of living tissue after a long period of attack appears to be evidence. Long-time observations under forest conditions of actual developments are necessary to determine whether the hypothesis is substantiated.—*E. N. Munns*.

506. HOLBERT, J. R., JAMES G. DICKSON, AND H. HOWARD BIGGAR. Correlation of early growth variation and productivity of maize as influenced by certain pathologic factors. [Abstract.] *Phytopath.* 10: 57-58. 1920.

507. JOHNSON, A. G., AND W. W. MACKIE. Evidence of disease resistance in barley to attacks of *Rhynchosporium*. [Abstract.] *Phytopath.* 10: 54. 1920.

508. JONES, L. R., J. C. WALKER, AND W. B. TISDALE. Fifth progress report of *Fusarium*-resistant cabbage. [Abstract.] *Phytopath.* 10: 64. 1920.

509. McCLINTOCK, J. A. Field tests with strains of wilt-resistant tomato seed in 1919. [Abstract.] *Phytopath.* 10: 59. 1920.

510. MELCHERS, L. E. The resistance shown by three hard winter wheats, Kanred (P762), P1066, and P1068 to plant diseases. [Abstract.] *Phytopath.* 10: 52. 1920.

511. MELCHERS, LEO E., AND JOHN H. PARKER. The resistance of Kanred (P762), P1066, and P1068, three hard winter wheats, to leaf rust. [Abstract.] *Phytopath.* 10: 52-53. 1920.

512. RUMBOLD, CAROLINE. Causes for the production of pathological xylem in the injected trunks of chestnut trees. *Phytopath.* 10: 23-33. 2 pl. 1920.—The author concludes that the production of pathological xylem in the phloem region of the trunks of injected chestnut trees [*Castanea dentata*] is due to (1) the mechanical severance of vascular tissues, and (2) the chemical stimulation of cells.—J. G. Dickson.

513. WOODWORTH, C. M., AND FLORENCE COERPER BROWN. Studies on varietal resistance and susceptibility to bacterial blight of the soy bean. [Abstract.] *Phytopath.* 10: 68. 1920.

THE PATHOGENE (BIOLOGY, INFECTION PHENOMENA, DISPERSAL)

514. CLAYTON, E. E. The relation of soil temperature to the development of the tomato *Fusarium* wilt. [Abstract.] *Phytopath.* 10: 63-64. 1920.

515. HUNGERFORD, CHAS. W., AND A. E. WADE. Relation between soil moisture and bunt infection in wheat. [Abstract.] *Phytopath.* 10: 53. 1920.

516. JONES, L. R., AND H. H. MCKINNEY. The influence of soil temperature on the development of potato scab. [Abstract.] *Phytopath.* 10: 63. 1920.

517. MACINNES, JEAN. The effect of temperature and light on *Fusarium* sp. causing wheat scab. [Abstract.] *Phytopath.* 10: 52. 1920.

518. ROSENBAUM, J. Infection experiments on tomatoes with *Phytophthora terrestris* Sherb. and a hot water treatment of the fruit. *Phytopath.* 10: 101-105. 1920.—The writer found that because of its effect on zoospore liberation, an abundant moisture supply in diseased soil is necessary to produce an epidemic infection with *P. terrestris*. The addition of copper sulphate solution (1:5000) to infested soil prevented infection of green tomatoes when in contact with the soil. The immersion of green tomatoes in water at 60°C. for 1½ minutes prevents spread of the rot where the infection is very recent and the fungus has not penetrated deeply into the tissues.—J. G. Dickson.

519. ROSENBAUM, J. Studies with *Macrosporium* from tomatoes. *Phytopath.* 10: 9-22. 2 pl., 1 fig. 1920.—A study of the early blight, or "nail head" spot, of the tomato is summarized, the author drawing the following conclusions: Infection takes place without previous injury to the fruit, however only on the immature fruit; the disease does not originate in transit on mature fruit picked from an infected field, but it may develop in transit on immature fruit picked from infected fields; the disease does not spread from infected fruit to adjacent healthy fruit in transit. The author concludes that the causal organism of the "nail head" spots on fruits, stems, and leaves of the tomato is different specifically from *Macrosporium solani* from potatoes and suggests the use of the binomial *M. tomato* Cooke.—J. G. Dickson.

520. TISDALE, W. B. The relation of soil temperature and soil moisture to the occurrence of cabbage yellows. [Abstract.] *Phytopath.* 10: 63. 1920.

521. WHITE, J. H. On the biology of *Fomes applanatus* (Pers.) Wallr. *Trans. Roy. Canadian Inst.* 12: 133-174. Pl. 2-7, fig. 1-2. 1920.—The investigations have followed along three main lines of inquiry: (1) The study of the morphology and ecology of *F. applanatus* and of the action on its host; (2) a determination of etiological relationships by culture methods, and a testing of the applicability of such methods to a study of timber destroying

fungi; (3) a search for possible criteria by which parasitic attacks on wood may be distinguished from saprophytic action. The particular type of decay in timber due to *F. applanatus* has now by actual culture been linked with its causal agent. The species has been proved to be a wound parasite, in southern Ontario one of the commonest and most destructive. The occurrence of wound gum and the multiplication of tyloses in a band marking the advance of a wood destroying fungus in a living tree would appear to furnish an unerring criterion for the recognition of a fungus as a parasite.—*R. B. Thomson.*

522. WILTSHIRE, S. P. The apple canker fungus. Ann. Rept. Agric. and Hort. Res. Sta. Univ. Bristol 1919: 23-29. 1919.—*Nectria ditissima* ejects its ascospores so that pure cultures were obtained by the inverted plate method. Mature perithecia were secured on malt extract agar in tubes.—Critical temperatures for the fungus in culture are: Minimum about 5°, optimum, 20-22°, maximum about 30°C.—Infection through young buds was very abundant in 1918. The spores and mycelium were found abundantly on bud scales in September but it is not yet established that the fungus penetrates in the absence of injury. Infections about galls produced by woolly aphids were confined to those that had broken open.—*D. Reddick.*

DESCRIPTIVE PLANT PATHOLOGY

523. ANONYMOUS. Gulbladede Hortensier. [Yellows of Hydrangea.] Gartner-Tidende [København] 36: 139. 1920.—Hydrangea should be planted in rather light soil not too rich in manure. The yellows may be caused by too heavy soil, presence of manure, drought, or starvation.—*Ernst Gram.*

524. BENNETT, C. W. Phoma root-rot of celery. [Abstract.] Phytopath. 10: 67. 1920.

525. BROWN, NELLIE A., AND R. B. HARVEY. Heart rot, rib rot, and leaf spot of Chinese cabbages. Phytopath. 10: 81-90. 4 fig. 1920.—The Chinese cabbage (*Brassica pekinensis* and *B. chinensis*) is subject to the black rot disease of the common cabbage produced by *Bacterium campestris*, and, as in the common cabbage, there may be also a rapid secondary infection by a soft rot organism. High temperature and excessive moisture favor the development of the disease. Control measures are suggested.—*J. G. Dickson.*

526. BURGER, O. F. Decay in citrus fruits during transportation. Monthly Bull. Dept. Agric. California 9: 365-370. 1920.—Lemon decay (due to *Phomopsis citri*), a disease new to California lemons, was found in California during the season 1919-20. The writer discusses the economic importance of stem-end rot and blue-mold decay on citrus fruits in transportation. Stem-end rot infection takes place in the field. To insure sound fruit the disease should be eliminated from the groves. Proper methods of handling, packing, and shipping are given for blue-mold decay control.—*E. L. Overholser.*

527. BYARS, L. P. A disease of red clover and strawberry in the Pacific Northwest caused by the nematode *Tylenchus dipsaci* (Kühn) Bastian. [Abstract.] Phytopath. 10: 66. 1920.—See Bot. Absts. 8, Entry 528.

528. BYARS, L. P. A nematode disease of red clover and strawberry in the Pacific Northwest. Phytopath. 10: 91-95. 2 pl. 1920.—A disease caused by *Tylenchus dipsaci* is described. [See Bot. Absts. 8, Entry 527.]—*J. G. Dickson.*

529. CHEN, CHUNJEN C. [A study of American cotton diseases.] Hua-Shang-Sha-Chang-Lien-Ho-Hui-Ki-Kau [China Cotton Jour.] 14: 245-256. 1920.—The cause, symptoms, means of transmission, and control of the following important cotton diseases are reviewed: Angular leaf spot, anthracnose, wilt, root-knot, potash-hunger, damping-off, root rot, Diplodia boll rot, shedding of bolls and squares, and leaf spot. The reduction in cotton yield in the United States due to diseases is discussed and statistics are given. The author also points out the

possibility of introduction of serious diseases into China through the large importation of American cotton seeds, and urges the Chinese cotton growers to practise the precaution of seed fumigation.—*Chunjen C. Chen.*

530. COOK, MEL. T. The *Alternaria* fruit rot and *Rhizoctonia* stem rot of tomatoes. [Abstract.] *Phytopath.* 10: 59. 1920.

531. COOK, MEL. T. Blossom blight of the peach. [Abstract.] *Phytopath.* 10: 64-65. 1920.

532. COOK, O. F. A disorder of cotton plants in China: Clubleaf or cyrtosis. *Jour. Heredity* 11: 99-110. 1 pl., fig. 1-9. 1920.—A disease of the mosaic type is described as being destructive to cotton in China. Diseased plants develop a large number of shoots which give them a "witches' broom" appearance. The nodes are short and the leaves small and crinkled, often colored different shades of green, yellow, and red. The disease is believed to be infectious. Leafhoppers are suspected as agents of dissemination.—*C. W. Bennett.*

533. CROMWELL, RICHARD O. Recent studies on *Septoria* of wheat. [Abstract.] *Phytopath.* 10: 51. 1920.

534. DELACROIX, JORGE. Enfermedades de las plantas cultivadas. Enfermedades no parasitarias. [Diseases of cultivated plants. Non-parasitic diseases.] 12 × 18 cm., 392 p., 57 pl. Casa Editorial, P. Salvat: Barcelona, 1920.—A Spanish translation from the French edition, published as part of the "Enciclopedia Agricola."—*John A. Stevenson.*

535. DELACROIX, JORGE, Y ANDRÉS MAUBLANC. Enfermedades de las plantas cultivadas. Enfermedades parasitarias. [Diseases of cultivated plants. Parasitic diseases.] 12 × 18 cm., 457 p., 87 pl. Casa Editorial, P. Salvat: Barcelona, 1919.—A Spanish translation from the second French edition, published as part of the "Enciclopedia Agricola."—*John A. Stevenson.*

536. DURRELL, L. W. The purple sheath spot of corn. [Abstract.] *Phytopath.* 10: 54-55. 1920.

537. GLOYER, W. O. Apple blister canker. [Abstract.] *Phytopath.* 10: 58. 1920.

538. HARTLEY, CARL, AND GLENN G. HAHN. Notes on some diseases of aspen. *Phytopath.* 10: 140-147. 3 fig. 1920.—*Populus tremuloides* is found in certain regions to be unusually subject to disease. Trunk cankers in these regions seem to be important factors in shortening the life of the trees. *Fomes igniarius* is a frequent cause of premature death. The occurrence is also noted of (1) a twig blight suggesting in appearance the fire blight of pear; (2) leaf killing by *Sclerotium bifrons* E. & E., found in both the East and the West, and also attacking Lombardy poplar; (3) a bark blackening of obscure origin which prevents propagation by cuttings.—*Carl Hartley.*

539. HARVEY, R. B. Some enemies of the potato. *Sci. Amer. Monthly* 2: 120-122. Fig. 1-9. 1920.—The mechanism by which the hyphae of the "damping-off" fungus, *Pythium deBaryanum*, push through a cell wall barrier is described. Experimenting with slices of potato 3 or 4 cells thick and watching the process through the microscope, it was found that a hypha penetrates the cell wall in 5 minutes. The author believes that this is entirely too short a time to account for the breaking down of the cell wall by enzyme action. Zoospore dispersal of *Phytophthora infestans* is also illustrated.—*Chas. H. Otis.*

540. HOLBERT, J. R., AND G. N. HOFFER. Corn root and stalk rots. [Abstract.] *Phytopath.* 10: 55. 1920.

541. JONES, FRED RUEL. *Pythium* as a causal factor in "pea blight." [Abstract.] *Phytopath.* 10: 67. 1920.

542. McCUBBIN, W. A. A heart rot of peach. [Abstract.] *Phytopath.* 10: 65. 1920.

543. MORRIS, R. T. Hazel nuts. *Amer. Nut Jour.* 12: 57. 1920.—The fungus *Cryptosporella anomata* (Sacc.) appears to be the only factor preventing the successful introduction of foreign hazels into the U. S. A., though other enemies are also present. A depressed area in the bark with a swollen overhang of healthy bark around the margins characterizes infections by hazel blight. Effective control is possible by removing diseased tissues and spraying with Bordeaux mixture.—E. L. Overholser.

544. NEAL, DAVID C. Phony peaches: A disease occurring in middle Georgia. *Phytopath.* 10: 106-109. 1 pl., 1 fig. 1920.—A disease of peach at present restricted to the peach belt of middle Georgia, U. S. A., and frequently confused with "collar edema," is here described under the name common among growers. The disease is characterized by vivid green leaves which are larger than normal and hang on short, stubby branches. "As a result, the entire head of the tree is reduced to a rather compact shape, owing to the foreshortened internodes and resulting close spacing of the leaves." The amount of fruit set is small, low in quality, and late in ripening. All varieties have been found affected. The disease, the etiology of which is not discussed, has been found on 6-year-old seedlings.—G. H. Coons.

545. ORTON, W. A. Streak disease of potato. *Phytopath.* 10: 97-100. 1 pl., 1 fig. 1920.—Streak first appears on upper full grown leaves as elongated or angular spots which follow the veinlets and extend into the parenchyma. Longitudinal streaks soon appear on the petiole, which soon collapses; the hanging dead leaves are characteristic. Following this the stem turns brown and dies, beginning at a point below the tip. Tubers are not affected except as the period of growth is shortened. There is discoloration in cortex. Varieties Factor (European), Rural New Yorker, and many hybrid seedlings are susceptible. American varieties are more resistant than are European. Attempts to isolate a pathogenic organism from lesions have failed. The disease is not to be confused with advanced stages of leaf-roll or mosaic. It has been seen in northern U. S. A. from coast to coast but has not become more prevalent in 7 years.—Donald Reddick.

546. REDDY, C. S., AND W. E. BRENTZEL. Flax canker, a non-parasitic disease. [Abstract.] *Phytopath.* 10: 66-67. 1920.

547. ROSENBAUM, JOSEPH. A stem disease of tomato caused by *Macrosporium solani* E. and M. [Abstract.] *Phytopath.* 10: 59. 1920.

548. SPENCER, E. R. Black crust of Brazil nuts. [Abstract.] *Phytopath.* 10: 61. 1920.

549. STOVER, W. G. Some results of corn root rot work in Ohio. [Abstract.] *Phytopath.* 10: 55. 1920.

550. WANG, K. W. [Some cotton diseases.] Khu-Shou [Science-Publ. Chinese Sci. Soc.] 5: 1057-1062. 1920.—Diseases of cotton reviewed as to their causes and symptoms are yellow leaf blight (*Macrosporium nigricantium*), leaf spot, shedding of bolls, angular leaf spot (*Bacterium malvacearum*), wilt (*Fusarium vasinfectum*), damping-off (*Rhizoctonia* sp.), anthracnose (*Glomerella gossypii*), root rot (*Ozonium omnivorum*), leaf blight (*Mycosphaerella gossypina*), areolate mildew of cotton (*Ramularia areola*), boll rot (*Bacterium* sp.), and root knot (*Heterodera radiculicola*). A list of literature cited is also appended.—Chunjen C. Chen.

551. WILTSHIRE, S. P. A dieback of red currants. *Ann. Rept. Agric. and Hort. Res. Sta. Univ. Bristol* 1919: 30-33. 1919.—Branches of red currant suddenly wilt and die. This may happen at any time but is most noticeable in July. Cortex and wood of affected plant are infested with mycelium. *Cytosporina ribis* and *Nectria cinnabarina* have been isolated in culture and both are under test.—D. Reddick.

ERADICATION AND CONTROL MEASURES

552. ANONYMOUS. Certification of stocks of varieties of potato which are immune from wart disease. Scottish Jour. Agric. 3: 52-66. 1 pl. 1920.—The Board of Agriculture of Scotland has undertaken the enforcement of regulations prohibiting the planting of susceptible varieties in infected lands and is inspecting fields of immune varieties for certification as to varietal purity. No crop is certified which contains more than 0.5 per cent of rogues. Over 17,000 acres of approved immune varieties were certified in 1919. Distinguishing characters of immune varieties and common rogues are given.—H. V. Harlan.

553. ANONYMOUS. Beispiele erfolgreicher Beizung. [Examples of successful seed treatment.] Mitteil. Deutsch. Landw. Ges. 35: 616. 1920.—A brief note giving the results from treating rye with "Uspulin" and with "Fusariol" against *Fusarium* as reported by Dr. STEHER, Lübeck, in Zeitschr. Landw. Kammer Braunschweig. Based on a check plot treated with "Uspulin," a loss of 44,800 marks occurred on the untreated portion of the field. Fusariol treatment also resulted in large increases of grain and straw.—A. J. Pieters.

554. BARKER, B. T. P., C. T. GIMINGHAM, AND S. P. WILTSHIRE. Sulfur as a fungicide. Ann. Rept. Agric. and Hort. Res. Sta. Univ. Bristol 1919: 57-75. 1919.—Polysulfides possess fungicidal properties and act as contact fungicides. Tests of the decomposition products of polysulfides show that elemental sulfur is the essential fungicidal ingredient of the decomposed solutions. Spores of parasitic fungi are inhibited in germination by the presence of sulfur in hanging drops in the following order: *Sclerotinia fructigena* and *Phragmidium subcorticium*, 100 per cent inhibition; *Cladosporium fulvum*, *Fusicladium dendriticum*, *F. pyrinum*, 50 per cent; *Nectria ditissima*, *Botrytis cinerea*, and *Verticillium* sp. no inhibition.—The acid or alkaline reaction of secretion from germinating spores has no correlation with susceptibility to sulfur, although precipitated sulfur seems to be brought into solution by the secretions of various fungi and apparently to some extent by agar when used as a medium for germination.—D. Reddick.

555. CADORET, A. Les sulphatages après le 15 juillet. [The sulphates after July 15.] Prog. Agric. et Vitic. 70: 9-10. 1918.—From investigations conducted since 1877, it is quite definite that the critical period for infection of *Plasmopara* on the grape (*Vitis vinifera*) is from July 10 to July 15. During this period the vines should be well covered. If the weather continues wet after July 15, a copper spray should be applied every 8 to 12 days. In dry seasons a monthly application is sufficient. In sections where black rot (*Guignardia*) is epidemic, as was the case in 1918, the entire period is longer and it may be necessary to employ 1 per cent Bordeaux mixture from June 10 to harvest-time.—H. B. Smith.

556. COONS, G. H. Experiments on the control of stinking smut of wheat. [Abstract.] Phytopath. 10: 54. 1920.

557. GIMINGHAM, C. T., AND G. T. SPINKS. Soil sterilization. Ann. Rept. Agric. and Hort. Res. Sta. Univ. Bristol 1919: 37-42. 1919.—Soil infested with *Chrysophlyctis endobiotica*, the cause of potato wart, was placed in small pots and the following substances incorporated with it in the amounts indicated: Bleaching powder 1 gram, creosote 0.5 gram, chloro-picrin 0.3 gram, formalin 1 cc., powdered chalk 1.5 gr. (to neutrality) and 7.5 gr., "cymène" 0.25 gr. Steam-sterilized soil was used as a control. One week later a tuber was planted in each pot. At the same time other pots of the soil were planted and were moistened twice each week with the following solutions: Copper sulfate 2 per cent, sulfur dioxide 0.1 saturated solution, formalin 1 per cent, bleaching powder 1 per cent. Aside from steam sterilization the only agents which reduced the amount of disease to any appreciable extent were copper sulfate, excess of chalk, and perhaps creosote.—Experiments in progress with disinfectants for the control of *Rhizoctonia* on carrots and spinach were discontinued because of the disappearance of the disease. Bleaching powder at the rate of 2 ounces per sq. yd. can be used safely for carrots. When 8 ounces are used severe injury results.—D. Reddick.

558. GLOYER, W. O. Effect of straw mulch on potato leaf roll. [Abstract.] *Phytopath.* 10: 60. 1920.

559. GRAM, E. Uspulum som Afsvampningsmiddel. [Uspulum as a seed disinfectant.] *Ugeskrift Landmaend* [København] 65: 636. 1920.—"Uspulum" (mercuric salt of monochlorophenol) has been somewhat overestimated by certain writers and does not in the Danish experiments equal the standard treatments for cereal smuts and barley stripe. The supposed acceleration of the germination should be more thoroughly investigated before the chemical is recommended.—*Ernst Gram*.

560. HANSEN, H. J. Brugen af modstandsdygtige Stammer af Kaalroer og Turnips paa kaalbroksmittet Jord. [Resistant strains of swedes and turnips on club-rootground.] *Tidskr. Froeavl* [Roskilde] 9: 85-86. 1920.—The author directs attention to the fact that many farmers order resistant strains although they may not have club-root in their fields. The resistant strains are the highest yielders only on contaminated ground, and should be used only there.—*Ernst Gram*.

561. HOPKINS, E. F. Overwintering and control of bur clover leaf-spot. [Abstract.] *Phytopath.* 10: 66. 1920.

562. KEITT, G. W. A preliminary report on apple scab and its control in Wisconsin. [Abstract.] *Phytopath.* 10: 58. 1920.

563. KUNSTLER, J. Sur un traitement préventif de l'oidium. [On a preventative treatment for oidium.] *Compt. Rend. Acad. Sci. Paris* 171: 406-407. 1920.—The dusting of the leaves with flowers of sulfur is recommended.—*C. H. Farr*.

564. MARTIN, WILLIAM H. Sulfur experiments for the control of potato scab. [Abstract.] *Phytopath.* 10: 60. 1920.

565. SPINKS, G. T. Spraying trials. *Ann. Rept. Agric. and Hort. Res. Sta. Univ. Bristol* 1919: 43-45. 1919.—Varieties of apples and pears susceptible to scab [*Venturia*] were sprayed once just before the blossoms opened. Little scab developed on the unsprayed trees. Bordeaux mixture, copper stearate and Burgundy mixture proved equally effective in controlling the diseases but the latter caused injury to foliage.—*D. Reddick*.

566. STOVER, W. G., F. H. BEACH, AND T. H. PARKS. Results of spraying the apple for blotch in Ohio in 1919. [Abstract.] *Phytopath.* 10: 58. 1920.

567. TEMPLE, C. E. Tomato spraying experiments for the control of *Septoria*. [Abstract.] *Phytopath.* 10: 60. 1920.

568. VILLEDIEU, G. De l'action des eaux météoriques sur les dépôts des bouillies cupriques. [The action of rain water on deposits from copper spraying materials.] *Compt. Rend. Acad. Sci. Paris* 171: 260-263. 1920.—It is found that zoospores of downy mildew [*Plasmopara viticola*] live well in acid media but do not develop in the presence of alkali. It is therefore desirable to have spraying mixtures such that H_2SO_4 will not be generated when the sulfur compounds brought down by rain mix with the spray deposits on the leaf.—*C. H. Farr*.

569. WALKER, J. C. Occurrence and control of black leg of cabbage. [Abstract.] *Phytopath.* 10: 64. 1920.

570. WESTERDIJK, JOHANNA. Das Spritzen der Kartoffeln in den Niederlanden. [Spraying potatoes in the Netherlands.] *Jahresber. Ver. Angew. Bot.* 16: 132-138. 1918.—A résumé of the present status of potato spraying in Holland.—*P. J. Anderson*.

MISCELLANEOUS (COGNATE RESEARCHES, TECHNIQUE, ETC.)

571. BLAIR, R. J. Wood destroying fungi in pulp and paper mill roofs. [Abstract.] *Phytopath.* 10: 61. 1920.
572. BOAS, I. H. The preservation of timber in structures. *Australian Forest. Jour.* 3: 209-212. 1920.—The decay of timber, preservative treatment, and the necessity for proper sanitation in yards are briefly discussed.—*C. F. Korstian.*
573. HARTLEY, CARL. Abnormal growth induced by chloral hydrate soil treatment. *Phytopath.* 10: 334-335. 1 fig. 1920.—The addition of small amounts of chloral hydrate to sandy soil resulted in very abnormal growth of seedlings of *Pinus ponderosa*. The plants during their first few weeks are distinctly larger than normal, and the cotyledons, and in some cases also the first leaves formed, were attached to each other to form sheaths. The same phenomenon, but to a much less marked degree, has been observed in pine seedlings in autoclaved mixtures of soil and compost.—*Carl Hartley.*
574. HUNTOON, F. A., P. MASUCCI, AND EDITH HAMUN. Antibody studies. Part 3. [A preliminary report on the chemical nature of bacterial antibodies.] *Jour. Amer. Chem. Soc.* 42: 2654-2661. 1920.—The antibody molecules are of large size and of colloidal nature. They are unaffected by the enzyme trypsin. They are not precipitated by solutions containing little or no electrolyte. Antibodies are not soluble in ether, nor are they precipitated by a short exposure to 30 per cent NaCl. Dilute alkalies or dilute acids do not injure them. Temperatures as high as 60°C. do not injure them, but they are altered by higher temperatures.—*J. M. Brannon.*
575. KOTILA, J. E. Leaf hoppers and hopperburn of potato leaves. [Abstract.] *Phytopath.* 10: 61-62. 1920.
576. LEEFMANS, S. Kenmerken van bliksemslag bij klappers. [Symptoms of lightning in coconut trees.] In *De Klappertor.* [The coconut beetle.] Mededeel. Lab. Plantenz. Dept. Landb. Nijv. en Handel [Buitenzorg] 41: 46-47. Pl. 15. 1920.—Three groups of lightning-injured coconut palms are described, one illustrated by a photograph, to distinguish between lightning injury and beetle injury. One of the groups included 12 trees. The injury involved the sharp drooping of the older leaves, excentric injury to the top, apparently burned lesions with a "scorched" odor, scars running down the trunk and in some cases gum exudation from splits in the lower part of the trunk. The younger leaves which did not immediately droop were apparently scorched at their bases. Natives testified that the trees had been struck by lightning.—*Carl Hartley.*
577. LEES, A. H. Big bud. *Ann. Rept. Agric. and Hort. Res. Sta. Univ. Bristol* 1919: 50-56. 1919.—Big bud of currant is caused by a mite which lives in the interior of the buds. During April, May, and June it is migrating to new buds. Boskoop Giant, introduced as a variety immune to big bud, has proved to be one of the most susceptible. "French" has had a somewhat similar history. Seabrook's Black remains relatively free from big bud in Chelmsford but is affected at Long Ashton. Apparent immunity in Chelmsford is really extreme susceptibility which results in early death of terminal bud and its replacement by a lateral bud. Chelmsford has a dry summer, Long Ashton a moist one. This is thought to affect the growth of the plants sufficiently to account for the differences noted.—*D. Reddick.*
578. RUMBOLD, CAROLINE. Giving medicine to trees. *Sci. Amer. Monthly* 2: 114-116. 5 fig. 1920. [Reprinted from *Amer. Forestry* 26: 359-362. 1920.]—See *Bot. Absts.* 6, Entry 1284.
579. RUTGERS, A. A. L. Bliksemschade bij Hevea. [Lightning injury in Hevea.] Mededeel. Alg. Proefsta. A. V. R. O. S. [Medan, Sumatra] *Rubberserie* 18. 1919.—Reprinted from the *Arch. Rubbercult.* 3: 163-171. 1919.

PHARMACEUTICAL BOTANY AND PHARMACOGNOSY

HEBER W. YOUNGKEN, *Editor*E. N. GATHERCOAL, *Assistant Editor*

(See also in this issue Entries 135, 604, 631)

580. ANONYMOUS. The eradication of weeds. *Agric. Gaz. New South Wales* 31: 881. 1920.—Attention is called to poison tulip (*Homeria collina*), known to have toxic properties.—*L. R. Waldron.*

581. CABANNES, E. Contribution à l'étude des propriétés physiologiques et de la posologie du *Geranium maculatum*. [Contribution to the study of the physiological properties and the dosage of *Geranium maculatum*.] *Bull. Sci. Pharm.* 27: 22-25. 1920.—It was found that therapeutically valuable preparations can be made from the plant and that it may be used as a substitute for rhatany and at times for ergotin, cinchona, and calumba.—*H. Engelhardt.*

582. DELAUNEY, P. Extraction de glucosides de deux Orchidées indigènes; identification de ces glucosides avec la Loroglossine. [The extraction of glucosides from two orchids and the identification of these glucosides as Loroglossine.] *Compt. Rend. Acad. Sci. Paris* 171: 435-437. 1920.—A glucoside found in *Orchis Simia* and *Ophrys aranifera* proves to be identical with Loroglossine found, in 1919, in *Loroglossum hircinum*. The various tests are applied.—*C. H. Farr.*

583. GONNERMANN, M. Der Eisengehalt der Öle, Fette, Wachsorten, Harze, Gummi-harze, Gummiarten; sowie einige Analysen über den Gehalt an Kieselsäure und Tonerde. [The iron content of oils, fats, waxes, resins, gum-resins, and gums; also some analyses of silicic acid and alumina content.] *Biochem. Zeitschr.* 95: 286-295. 1919.—The analyses include materials from animal and vegetable sources, many of the latter being of pharmaceutical interest. Senegal gum appeared to be the only plant material which showed no iron content. The other substances of plant origin showed iron in quantities ranging from a trace to 29.7 per cent.—*W. W. Bonns.*

584. GORIS, A., ET VISCHNIAC, CH. Constitution du primevérose, de la primevérine et de la primulavérine. [Constitution of primeverose, primeverin and primulaverin.] *Bull. Soc. Pharm.* 27: 67-70. 1920.—From *Primula officinalis* two glucosides, primeverin and primulaverin, and a sugar, primulaveroose, have been isolated. Primeverin yields on hydrolysis primeverose and the methyl ester of beta metoxyresorcylic acid, while primulaverin is split up into the same sugar and the methyl ester of metametoxysalicylic acid. Primeverose is composed of glucose and xylose.—*H. Engelhardt.*

585. GREENISH, HENRY G. Gum Arabic and senna. *Pharm. Jour.* 105: 448-449. 1920.—Gum Arabic is obtained almost exclusively from *Acacia verec* distributed throughout the African sub-desert from Senegal to Erythraea. Gum is yielded only by those trees located in soil which becomes thoroughly dry during the dry season, only on the younger branches where the cork is thin, and only after wounding or piercing of the bark. It apparently not only serves to seal the wound but also to retain moisture for the plant. All of the nice grades of the gum are obtained from trees artificially wounded or "tapped." Experiments on propagation and the influence of various methods of tapping are under way. Senna is obtained from wild and cultivated plants of *Cassia acutifolia*, but wild plants of *Cassia angustifolia* and *Cassia obovata* are common. Leaflets from cultivated plants are somewhat thinner, narrower, and more elongate than from the wild plants.—*E. N. Gathercoal.*

586. GUERIN, P., ET A. GORIS. Une nouvelle plante a coumarine: *Melittis melissophyllum* L. [A new source for coumarine: *Melittis melissophyllum*.] *Compt. Rend. Acad. Sci. Paris* 170: 1067-1068. 1920.—Coumarin is produced by the leaves of this plant, which is related to the official lavender, which also produces it.—*C. H. Farr.*

587. HOLMES, E. M. Note on Uzara. Pharm. Jour. 105: 507. 1920.—The plant yielding the root constituting this proprietary preparation appears to be *Schizoglossum Shirensse*, N. E. Brown, described in Kew Bull. Miss. Inf. 1895: 253. 1895.—*E. N. Gathercoal*.

588. VAN KETEL, B. A. Een nieuwe methode voor de quantitative bepaling van werkzame bestanddeelen in grondstoffen, in het bijzonder in Kinabast. [A new method for the quantitative estimation of the active principles in drugs and especially in cinchona bark.] Pharm. Weekblad 57: 650-651. 1920.—The following method, which, as the author believes, very probably can be adapted for the estimation of the alkaloids in other plants also, has given good results in the estimation of cinchona alkaloids. Four to 5 gms. of the powdered cinchona bark are mixed with slaked lime and triturated with sufficient ammonia water to obtain a granular mass. This is extracted with chloroform in an extraction apparatus and the solution is evaporated to dryness. As an alternative process the author recommends extracting the mixture of bark, lime, and ammonia with benzene.—*H. Engelhardt*.

589. LECLERC, H. La verveine (*Verbena officinalis*). [Vervain (*Verbena officinalis*).] Bull. Sci. Pharm. 27: 104-109. 1920.—A short description of this and allied plants and a history of their use in therapeutics.—*H. Engelhardt*.

590. MASSY. Les goudrons végétaux sur le marché de Meknès (Maroc). [The vegetable tars on the market at Meknès (Morocco).] Jour. Pharm. et Chimie 21: 433-439. 1920.—A chemical study of the tars gatrane er-rekik obtained from the cedar tree, gatrane er-rehid obtained from *Thuja*, amine obtained from a tree which probably is *Juniperus phoenicea*, and oil of cade obtained from *Juniperus oxycedrus*.—*H. Engelhardt*.

591. NETOLITSKY, F. Eine Methode zur makrochemischen Untersuchung von Zellinhaltskörpern. [A method for the macroscopic study of cell inclusions.] Biochem. Zeitschr. 93: 226-229. 1919.—Pulverized plant material was shaken with inactive liquids of high specific gravity (chloroform, carbon tetrachloride, bromoform). The differential sedimentation afforded a means of separating the materials to be examined (crystals, cystoliths, hairs, etc.) from the impurities in the plant powders.—*W. W. Bonns*.

592. MOOYEN, A. M. Het Urson en zijne verspreiding in het plantenrijk. [Urson and its occurrence in the vegetable kingdom.] Pharm. Weekblad 57: 1128-1142. 1920.—All plants of the Ericaceae contain urson, which is also present in various species of *Epacris*, in crowberry, and in four species of ivy. Urson has the empirical formula $C_{23}H_{47}O_7COOH$, forms a well-crystallized methylester and crystallizable potassium and sodium salts. It does not possess a double bond nor does it contain hydroxyl, ketonic, aldehydic, or methoxylic groups.—*H. Engelhardt*.

593. ROTHEA, F. Toxicité des coques de cacao dans l'alimentation des chevaux et du bétail. [Toxicity of cacao shells when used as feed for horses and cattle.] Bull. Sci. Pharm. 27: 355-356. 1920.—A number of cases of poisoning of horses and other domestic animals were traced to the presence of as much as 0.7 per cent of theobromine and 0.26 per cent of caffeine in the shells. Therefore, only shells from which the alkaloids have been extracted should be used, and it is recommended that such shells be fed only in mixtures with other feed.—*H. Engelhardt*.

594. TANRET, G. Les alkaloides du grenadier. [The alkaloids of pomegranate.] Bull. Sci. Pharm. 27: 486-493. 1920.—The author discusses and criticizes the work of HESS and EICHEL on this subject and sustains the view of CH. TANRET in regard to the chemical constitution of the various alkaloids in pomegranate.—*H. Engelhardt*.

595. URK, H. W. VAN. Bijdrage tot de kennis van *Peucedanum sativum* (*Pastinaca sativa* L.) II Mikrochemie en Anatomie. [Contribution to the knowledge of *Peucedanum sativum*. (*Pastinaca sativa* L.) II Microchemistry and anatomy.] Pharm. Weekblad 57: 883-887. Fig. 7.

1920.—The author confirms the presence of an alkaloid in garden parsley; it occurs in all parts of the plant and in those but 1 year old. The root contains a fatty and a volatile oil, together with starch; the amount of fatty oil appears to decrease with increase of starch. Fall seedlings store starch, while in spring seedlings starch is absent. Microscopically the root fibers are similar to, and indistinguishable from, those of *Angelica* root. An adulteration of garden parsley with *Angelica* root is highly improbable. *Conium* can easily be distinguished microscopically from garden parsley. It has been claimed that the juice of garden parsley produces dermatitis, but this seems to be due only to an idiosyncrasy of hypersensitive persons.—H. Engelhardt.

596. WAAL, M. DE. Onderzoek naar de insecticide kracht der composieten, in het bijzonder van *Helenium autumnale*. [Experiments in regard to the insecticidal power of the Compositae, especially of *Helenium autumnale*.] Pharm. Weekblad 57: 1100-1107. 1920.—After giving a rather complete review of the insecticidal plants now in general use, the author reports on experiments with different substances claimed to act as insecticides. As test animals, flies, bedbugs, plant-lice, fleas, and cockroaches were used and the following substances were allowed to act on them: *Sabadilla* seed, pyrethrum, cevadine, opium, extract of belladonna, cannabis, a mixture of cevadine and opium, tobacco, naphthalin, a mixture of borax and sugar, copper acetate, pomegranate, linseed flour, lupulin, blue flag root, anise oil, formaldehyde vapors, chloroform, euphorbium, white mustard seed, kamala, lycopodium, quassia, saponaria root, soap bark, and tumeric. All these substances, with the exception of *sabadilla* seed and cevadine, gave negative results. These 2 acted on the insects as does insect powder, i.e., they paralyzed the motor nervous center. An examination of more than 100 species of Compositae, grown in Holland, showed that only *Pyrethrum roseum* and *Chrysanthemum cinerariaefolium* possess insecticidal properties. Half-opened blossoms of *Helenium autumnale* exerted only a very slight power and this action is not due to the glucoside present in the flower, but to a volatile oil, pyrethron.—H. Engelhardt.

597. WALLIS, T. E. Analytical microscopy—X. Pharm. Jour. 105: 528-531. 5 fig. 1920. Micrometry and drawing are considered.—E. N. Gathercoal.

598. WESTER, D. H. Het mangaangehalte van eenige *Digitalis*-soorten van verschillende bodem, en de invloed van een mangaanbemestig. [The content of manganese in some species of *Digitalis* grown on different soils and the influence of fertilizers containing manganese.] Pharm. Weekblad 57: 660-662. 1920.—Some years ago BURMAN claimed that only *Digitalis purpurea* contains manganese and that it was not present in other species of the genus, such as *D. ambigua*, *D. lutea*, etc., and that the presence of manganese in the ash of *digitalis* could serve to distinguish the official drug from products of other species of *Digitalis*. The author, however, found that all plants of the foxglove family contain manganese. The ash of the green flowering tops of *D. purpurea* contains 0.7-0.85 per cent; the seeds 3.2-3.7 per cent; and the leaves 1.3-3.2 per cent. In the dry plant parts, the percentages of manganese in the ash are respectively 5.8-9.7, 3.5-4.1, and 6-13. In general the percentage of manganese in *Digitalis* is to be considered as low in comparison with that of other plants. Furthermore, the percentage of manganese varies considerably with the soil in which the plant grows.—H. Engelhardt.

PHYSIOLOGY

B. M. DUGGAR, *Editor*CARROLL W. DODGE, *Assistant Editor*

(See also in this issue Entries 12, 31, 32, 80, 342, 369, 370, 378, 412, 427, 512, 514, 515, 516, 517, 539)

GENERAL

599. ANONYMOUS. [Rev. of: ONSLOW, M. W. *Practical plant biochemistry*. vii + 178 p. University Press: Cambridge, 1920.] *Nature* 106: 176. 1920.—See Bot. Absts. 8, Entry 602.

600. ANONYMOUS. [Rev. of: ZSIGMONDY, R. *The chemistry of colloids*. (Trans. by ELLWOOD, B. SPEAR.) x + 288 p. John Wiley & Sons: New York, 1917.] *Sci. Prog.* [London] 14: 687-688. 1920.

601. MOLISCH, HANS. *Pflanzenphysiologie als Theorie der Gärtnerei*. [Plant physiology as a theory of horticulture.] 3 ed., xi + 326 p., 145 fig. Gustav Fischer: Jena, 1920.—The 2 earlier editions of this work appeared during the war, and consequently are perhaps little known to other than German readers. Further than to note a rather general revision of the book, it is necessary to outline briefly the method of treatment. Nutrition, including salt requirements, soil relations, photosynthesis, transpiration, the movement of food substances, and certain special topics, constitutes about one-third of the book; and, apparently in accord with its purpose, there is no general discussion of metabolism. After a very brief treatment of respiration, about 80 pages are devoted to growth, under which caption is included environmental relations, growth movements, organ formation, and the rest period. In this chapter particularly, many horticultural practises are analyzed. The effects of cold, freezing, are briefly presented; and this is followed by an extended chapter on reproduction, both vegetative and sexual, with ample consideration of such processes and phenomena as grafting, chimeras, parthenocarpy, stuffed flowers, etc. In the last 2 chapters there are inextensive accounts of seed germination and of variability, heredity, and plant production.—B. M. Duggar.

602. ONSLOW, M. W. *Practical plant biochemistry*. 178 p. University Press: Cambridge, 1920.—The author presents this book neither as an organic chemistry (an elementary knowledge of which is assumed) nor as a plant physiology, but rather to fill the gap which she conceives to exist between the two fields. A very brief characterization is made in the introduction to the classes of organic compounds in plants; the importance of the synthetic and condensation processes; properties associated with the colloidal state; and the significance of chlorophyll, enzymes, and the regulation and control of metabolism. Nine topics follow, namely, the colloidal state, enzyme action, carbon assimilation, carbohydrates and their hydrolyzing enzymes, the fats and lipases, aromatic compounds and oxidizing enzymes, the proteins and proteases, glucosides and glucoside-splitting enzymes, and the plant bases. In general each chapter treats in appropriate order 2 aspects of the particular topic. On the one hand there is a condensed account of the occurrence, chemical properties and other characteristics of the products included, together with practical directions for experiments on the preparation or identification of the more important groups or compounds. On the other hand brief suggestions are usually given concerning the present knowledge of the course of metabolism, especially the formation and hydrolysis (or decomposition) of the materials discussed, with suitable experiments to demonstrate the action of any enzymes catalyzing the reaction.—The biochemistry of certain special fermentation processes, respiration, and salt nutrition are among the topics not included in this work. At the end of each topic adequate references are given to texts and special articles. [See Bot. Absts. 8, Entry 599.]-B. M. Duggar.

603. SAVAGE, W. G. Food poisoning and food infections. *viii* + 247 p. University Press: Cambridge, 1920.—This small handbook is one of the Cambridge Public Health Series published under the editorship of G. S. GRAHAM-SMITH and J. E. PURVIS. It is intended to be a reference work for the medical profession and to instruct public health and hygienic committees; but it also includes several chapters involving certain physiological relations of the bacteria, and containing data not usually assembled in bacteriological handbooks.—*B. M. Duggar*.

604. SAUVAGEAU, CAMILLE. Utilisation des algues marines. [Utilization of marine algae.] 394 p., 26 fig. Librairie Octave Doin: Paris, 1920.—The fourth volume of the Encyclopédie Scientifique published under the direction of Dr. TOULOUSE has just appeared and deals in a comprehensive manner with the economic uses of sea weeds. After a general introduction on the marine algae, there is a full discussion of the kelps, including *Nereocystis*, *Macrocystis*, and *Alaria*, on the Pacific coast, together with the methods of harvesting this plant. The use of algae for fertilizers is treated in the second chapter and includes considerable valuable information as to the analysis and practical value of this material for agricultural purposes. The uses of the brown and red algae in various industries are treated at length and a short discussion of the making of paper from *Zostera* and *Posodonia* is included. There is a full summary of the information extant on the use and value of marine algae for food, and the work concludes with brief references to various other ways in which algae have been used, particularly in medicine. There are brief notes on the method of collecting and mounting algae for artistic effect, as well as some information on the cultivation of marine forms. A fairly complete bibliography on the entire subject is appended.—*George T. Moore*.

PROTOPLASM, MOTILITY

605. BAILEY, I. W. The significance of the cambium in the study of certain physiological problems. Jour. Gen. Physiol. 2: 519-533. 1920.—The author suggests that cambium cells furnish very desirable material for studies of certain problems such as the working sphere of the nucleus, the nucleocytoplasmic relation, the dynamics of karyokinesis, and cytokinesis. The cells are of 2 distinct types, small, nearly isodiametric cells, more or less similar to terminal meristem and embryo cells, and large, much elongated cells. The elongated cells can be induced to divide to form cells of the small type. Data are presented showing that there may be no very close relation between nuclear size, number or mass of chromosomes, and cell size.—*Otis F. Curtis*.

DIFFUSION, PERMEABILITY

606. LESAGE, PIERRE. Expériences utilisables en physiologie végétale, sur l'osmose et sur l'aspiration due à l'évaporation. [Experiments useful in plant physiology, on osmosis and gaseous exchange due to evaporation.] Compt. Rend. Acad. Sci. Paris 171: 358-360. 1920.—An experiment of Dutrochet was repeated using various liquids and a membrane of acetocellulose. It was found that this membrane, varying with its origin and manipulation, cannot always be depended upon to produce osmosis.—*C. H. Farr*.

607. LOEB, JACQUES. The reversal of the sign of the charge of membranes by hydrogen ions. Jour. Gen. Physiol. 2: 577-594. 1920.—The sign of the electrical charge on a collodion membrane treated with protein becomes positive when the hydrogen-ion concentration exceeds a certain limit. Evidence is presented showing that a film of protein adheres to the membrane, and that the hydrogen-ion concentration at which reversal of the sign of the charge on the membrane takes place, varies in the same sense as the isoelectric point of the protein used.—*Otis F. Curtis*.

608. RABER, ORAN L. The antagonistic action of anions. Jour. Gen. Physiol. 2: 541-544. 1920.—By the electrical conductivity method of OSTERHOUT in experiments with *Laminaria Agardhii* the author finds antagonism between anions of sodium acetate and sodium sulfate.—*L. Knudson*.

609. RABER, ORAN L. A quantitative study of the effect of anions on the permeability of plant cells. *Jour. Gen. Physiol.* 2: 535-539. 1920.—This is a contribution on the influence of anions on permeability as determined by the electrical conductivity method of OSTERHOUT. The sodium salts of sulfocyanide, chloride, nitrate, acetate, tartrate, phosphate, and citrate were used individually in the first series of experiments in solutions of equal conductivity and in the second series at a concentration of 0.52 m. Comparing the resistance of *Laminaria Agardhii* after treatment with the individual salt solutions with the resistance of the control in sea water of the same conductivity, it was noted that citrate, phosphate, tartrate, and sulfate caused a marked decrease in resistance, while the bromide, sulfocyanide, chloride, and nitrate were less effective.—*L. Knudson.*

MINERAL NUTRIENTS

610. CANALS, E. Dosage du calcium et du magnésium dans différents milieux salins. [The amounts of calcium and magnesium to be used in different culture media.] *Compt. Rend. Acad. Sci. Paris* 171: 516-518. 1920.—It is found that iron salts used in culture solutions precipitate some of the calcium and magnesium. In addition, the aluminium salts precipitate some of the magnesium. This precipitation is prevented by adding a few drops of an acid such as acetic.—*C. H. Farr.*

611. HOFFER, G. N., AND R. H. CARR. I. Iron accumulation and mobility in diseased corn stalks. [Abstract.] *Phytopath.* 10: 56. 1920.

612. HOFFER, G. N., AND R. H. CARR. II. Experiments to test effects of iron salts on corn plants. [Abstract.] *Phytopath.* 10: 57. 1920.

613. PFEIFFER, TH., A. RIPPEL, UND CH. PFOTENHAUER. Über den Verlauf der Nährstoffaufnahme und Stofferzeugung bei der Gerstenpflanze. [The course of plant food absorption and assimilation in the barley plant.] *Fühlings Landw. Zeitg.* 68: 81-101. *Fig. 1-8.* 1919.—Barley plants were planted April 3 on well fertilized land. Representative samples of the aerial parts were taken April 24, when the third leaf was forming, May 30, before heading, June 14, just headed, July 7, in the milk, and July 23 (fully ripe), and total dry matter, ash, organic matter, phosphoric acid, lime, magnesia, potash, nitrogen, and silica determined in each case. Separate determinations were made on the leaves, stems, and heads. The total dry matter increased up to harvest time. All substances in the grain were most abundant at harvest time except lime and potash, which reached maxima during the milk stage. Total ash increased up to the time of the milk stage. The ash content of the leaves and stems was highest respectively at heading time and during the milk stage. Total organic matter increased steadily to harvest time, being highest in the leaves at heading time and in the stems during the milk stage. Total phosphoric acid increased up to harvest time, being highest in the leaves before heading and in the stems at heading time. Total lime increased up to the milk stage, being highest in the leaves at heading time and in the stems during the milk stage. Total magnesia increased up to heading time, but the proportion in the stems reached its maximum during the milk stage. Total potash increased up to the milk stage, being highest in the leaves before heading. Total nitrogen increased up to harvest time, being highest in the leaves before heading and in the stems at heading time. Total silica increased up to harvest time, being highest in leaves and stems during the milk stage.—*A. T. Wiancko.*

PHOTOSYNTHESIS

614. COUPIN, HENRI. Sur les plantules qui verdissent à l'obscurité. [On seedlings which turn green in the dark.] *Compt. Rend. Acad. Sci. Paris* 170: 1071-1072. 1920.—A comparison of seedlings of pines grown in the light with those grown in darkness reveals a difference in the amount of chlorophyll and anthocyan in the cotyledons and hypocotyl. Very little morphological aetiolation occurs in this species. Only one kind of chlorophyll develops in darkness.—*C. H. Farr.*

615. KÖGEL, P. R. Über die Photosynthese des Formaldehyds und des Zuckers. [On the photosynthesis of formaldehyde and sugar.] *Biochem. Zeitschr.* 95: 313-316. 1919.—A brief theoretical discussion. The author considers the possibilities of the action of light in effecting enol-keto transformations analogous to the formation of benzil-benzoin from benzil and H_2 in presence of light; the light performs the double function of benzoin formation and of effecting benzil-benzoin combination. Benzil reacting with H_2 results in stilbendiol, which by rearrangement gives benzoin. The latter is an enol-keto transformation. These reactions suggest to the author a theory of photosynthesis. Two molecules of CO_2 arranged as a simple polymer unite with 2 molecules H_2O to give tetrahydroxyethylene and O_2 . The former is an enol form, which by transformation to the keto form may result in 2 molecules of $HCOH$ and O_2 .—W. W. Bonns.

METABOLISM (GENERAL)

616. ANONYMOUS. [Rev. of: ARMSTRONG, E. F. The simple carbohydrates and glucosides. 3rd ed., x + 239 p. Longmans, Green & Co.: London, 1919.] *Sci. Prog.* [London] 14: 688-689. 1920.

617. ANONYMOUS. [Rev. of: FISHER, MARTIN H., AND MARION O. HOOKER. Fats and fatty degeneration: A physico-chemical study of emulsions and the normal and abnormal distribution of fat in protoplasm. ix + 155 p. John Wiley & Sons: New York, 1917.] *Sci. Prog.* [London] 14: 502. 1920.

618. ANONYMOUS. [Rev. of: SPOEHR, H. A. The carbohydrate economy of cacti. Carnegie Inst. Washington [D. C.] Publ. 287. 79 p., fig. 1-2. 1919.] *Sci. Prog.* [London] 14: 511-512. 1920.

619. BLAKE, J. C. The individuality of erythrodextrin. *Jour. Amer. Chem. Soc.* 42: 2673-2678. 1920.

620. BOAS, F., UND H. LEBERLE. Untersuchungen über Säurebildung bei Pilsen und Hefen. III. [Studies of acid formation by fungi and yeasts.] *Biochem. Zeitschr.* 95: 170-178. 1919.—The authors have studied the selective action of *Aspergillus niger* when grown in solution combinations of dextrose-acetamid, dextrose-acetamid-ammonium sulphate, dextrose-ammonium sulphate, dextrose-glycocol, dextrose-glycocol-acetamid, dextrose-peptone, dextrose-peptone-ammonium sulphate, and dextrose-ammonium sulphate. The data submitted are P_H variations in the substrate, growth (weight of mat and conidia formation), and reaction to Nessler's reagent. The strength of solutions ranged from 0.5-0.25 per cent. In the series with dextrose, acetamid, and ammonium sulphate the P_H values obtained during a 7-day experiment indicate that acetamid in presence of ammonium sulphate is not autolyzed. Similar results were obtained in the dextrose-glycocol-acetamid series, and in the series where peptone, dextrose, and ammonium sulphate were used in different combinations. The several experiments indicate a consistent election of nitrogen from ammonium salts as against the organic solutions used. The increased P_H values resulting are held to account for the partial inhibition of conidial formation and the presence of soluble starch in the solutions. On the basis of the results the authors conclude that lipoid solubility (possessed by acetamid) is not a factor in the metabolism of the fungus, and that strongly dissociated nitrogen compounds are elected in preference to those weakly dissociated.—W. W. Bonns.

621. BOKORNY, T. Weitere Beiträge zur organischen Ernährung der grünen Pflanzen mit Ausblicken auf die Praxis. [Further consideration of organic nutrition of green plants with reference to practical usage.] *Biochem. Zeitschr.* 94: 78-83. 1919.—Potted plants, cabbage among others, treated for several weeks with solutions of glycerin, methyl alcohol, etc., showed favorable results. Cabbage treated with the alcohol resulted in growth indicated by 164 g. (40 g. dry weight) as against 74 g. (18 g. dry weight) control. Alcohol-treated rye developed

spikes in over 3½ months, and set fruit. The total weight obtained was 24 g. as against 11.2 g. for controls. Beans treated with 2 per cent methyl alcohol far surpassed controls in growth in 14 days. Cucurbit and carrot seedlings placed directly in alcohol solutions were injured. Cabbage treated with 0.25 per cent glycerin solution attained in 3 months a weight of 138.1 g. as compared with 74.4 g. for the control. The foregoing suggests as fertilizer the wastes from cellulose industries in which the sulphite process is employed, such waste containing a varying amount of sugar in addition to other organic constituents. Experiments with such material as fertilizer were conducted on plants in pots and in other containers. The addition of sulphite wastes are stated to have increased growth. Brief consideration is given to the possible fertilizing values of urine, urea, and urea compounds, with citations from other workers.—*W. W. Bonns.*

622. BOURQUELOT, EM. Remarques sur la méthode biochimique de recherche des glucosides hydrolysables par l'émulsine à propos de la note de M. P. Delauney. [The biochemical methods for research on the glucosides hydrolysable by emulsin.] *Compt. Rend. Acad. Sci. Paris* 171: 423-425. 1920.—Fourteen new glucosides of this type have been found in addition to the 8 known before 1902. Some of these have now been found in other plants. Out of 281 species examined 205 contained glucosides of this type.—*C. H. Farr.*

623. BOURQUELOT, EM., ET M. BRIDEL. Recherche et caractérisation du glucose dans les végétaux par un procédé biochimique nouveau. [Detection and identification of glucose in plants by a new biochemical process.] *Jour. Pharm. et Chimie* 22: 209-215. 1920.—The usual tests applied for detecting glucose in plants, that is, reduction of Fehling's solution, fermentation produced by means of yeast, or conversion into the osazone by means of phenylhydrazine, are not specific for this sugar, because other sugars, such as the aldohexoses, the aldopentoses, maltose, gentiobiose, cellobiose, and even glucosides, such as verbenalin, have reducing properties. Levulose, mannose, galactose, maltose, and saccharose can be fermented by beer yeast, levulose and mannose give the same osazone. When to an aqueous solution of a glucoside emulsin is added, the former is hydrolyzed, glucose is formed, and the solution becomes dextrorotatory. This reaction is reversible when carried out in an alcoholic medium, the glucose forming, for instance when methyl alcohol is used, a glucoside in the presence of emulsin, methyl glucoside, which is levorotatory. By applying this method, the authors succeeded in identifying glucose in juniper, *Loroglossum*, etc., which contain quite a number of other sugars in addition to glucose. For the details of the method the original should be consulted.—*H. Engelhardt.*

624. BOURQUELOT, EM., ET H. HÉRISSEY. Essai de synthèse biochimique d'un mannobiose. [Attempt to synthesize a mannobiose.] *Jour. Pharm. et Chimie* 21: 81-85. 1920.—The albuminoids of St. John's bread consist of mannan and galactan and are hydrolyzed by a ferment seminaise. This ferment, which is also present in *Trigonella foenum graecum*, *Medicago sativa* and *Sarothamnus scoparius*, has been utilized to synthesize mannobiose. For this purpose a maceration of lucerne seeds was allowed to act on an aqueous solution of mannose in the presence of a small amount of toluene. The results were not quite conclusive, a new substance probably consisting of 2 molecules of mannobiose, which, however, could not be obtained in a pure state, appears to be formed.—*H. Engelhardt.*

625. BOURQUELOT, EM., ET H. HÉRISSEY. Presence dans le Mélilot et l'Aspérule odorante de glucosides fournissant de la coumarine sous l'action hydrolysante de l'émulsine. [The presence of glucosides in *Melilotus* and *Asperula odorata* furnishing coumarin by the hydrolyzing action of emulsin.] *Jour. Pharm. et Chimie* 22: 289-298. 1920.—*Melilotus* and wood-root contain a glucoside which is split up by emulsin into coumarin and *d*-glucose, but the investigations do not throw any light on the constitution of the glucoside, which may contain other constituents besides these 2. The emulsin is present in the plant itself and can be obtained in powdered form. It readily hydrolyzes amygdalin and salicin.—*H. Engelhardt.*

626. BRIDEL, M. Sur la présence simultanée du gentianose et du saccharose dans les espèces du genre *Gentiana*. [The presence of both gentianose and saccharose in gentian.] Jour. Pharm. et Chimie 21: 306-311. 1920.—The simultaneous presence of both gentianose and saccharose in *Gentiana lutea*, *G. asclepiades*, *G. punctata*, *G. cruciata*, and *G. purpurea* can be explained by the gentiobiase (the ferment in gentian) acting both hydrolytically and synthetically, forming from the gentiobiose first saccharose and then, during the subsequent development of the root, transforming this again into gentiobiose.—H. Engelhardt.

627. LAST, E. Über die quantitative Bestimmung von geringen Zuckermengen bei Gegenwart von höheren und niederen Eiweissabbauprodukten. [The quantitative determination of small amounts of sugar in the presence of complex and of simple decomposition products of proteins.] Biochem. Zeitschr. 93: 66-81. 1919.—The BERTRAND titration method was used and the following abstract of his conclusions exhibits his results as to the limitations of the method. Precipitation of protein decomposition products affecting quantitative sugar determination is effected by using 2 g. neutral HgCl_2 per g. of protein (albumose, peptone) present. Acid and excess of HgCl_2 are to be avoided. Precipitation with $\text{Hg}(\text{NO}_3)_2$ according to the PATEIN-DUFAU method is satisfactory when accurately done.—If ereptone is present, there is a factor of error ascribed to the atomic grouping in the molecule. This is due to solution of cuprous oxide by the ammonia set free, and occurs either with boiling in alkaline solution or on long standing. Neutral HgCl_2 also precipitates ereptone in the test solutions to a degree sufficiently complete to give accurate sugar values. Here also precipitation with $\text{Hg}(\text{NO}_3)_2$ is satisfactory.—W. W. Bonns.

628. LUMIÈRE, AUGUSTE. Les vitamines sont-elles nécessaires au développement des végétaux? [Are vitamines necessary to the development of plants?] Compt. Rend. Acad. Sci. Paris 171: 271-273. 1920.—Fungi were cultivated on purely mineral and organic nutrients without the addition of vitamines and developed equally as well as in the presence of vitamines. Experiments are referred to which attempt to determine the properties of vitamines, such as precipitation, filtration, etc.—C. H. Farr.

629. RICHTER-QUITTNER, M. Eine Mikromethode der Acetonbestimmung. [A micro-method of acetone determination.] Biochem. Zeitschr. 93: 163-171. Fig. 1-2. 1919.

630. SHERRARD, L. C., AND G. W. BLANCO. The acid hydrolysis of sugar cane fiber and cotton seed hulls. Jour. Indust. Eng. Chem. 12: 1160-1162. 1920.—Of the total sugars produced by the acid hydrolysis of these materials, only a small quantity is fermentable, the larger portion being of the pentose variety.—Henry Schmitz.

631. TUNMANN, O. Über die Alkaloide bei Verwundungen der Pflanzen. [Alkaloids in relation to wounding of plants.] Biochem. Zeitschr. 95: 164-169. 1919.—The author has checked the work of TROEGELE, using *Atropa Belladonna* and *Pilocarpus pinnatifolius*. His conclusions, based upon quantitative and microchemical data obtained from these plants when subjected to traumatism and to snail depredations, are that such injuries do not result in increased alkaloidal content.—W. W. Bonns.

632. WISSELL, VON. Ueber die chemische Bestimmung der Stärke in verschiedenen Reisigarten und einigen anderen Pflanzenstoffen. [The chemical determination of starch in various kinds of prunings and other plant materials.] Landw. Jahrb. 53: 618-625. 1919.—The author describes in detail 2 methods for determining chemically the quantity of starch in plant materials and concludes that the method of EWERS, involving extraction with hot weak hydrochloric acid without pressure, gives more dependable results than that of REINKE involving the use of high pressures.—A. J. Pieters.

633. ZIJF, C. VAN. Over de mogelijkheid van het ontstaan van Hexamethyleentetramine in assimilerende planten end eene microchemische reactie op ammoniumzouten. [The possibility of the production of hexamethylenetetramine in assimilating plants and a microchemical

reaction of ammonium salts.] Pharm. Weekblad 57: 1345-1348. 1 fig. 1920.—The author believes that contrary to the statement of O. Loew "that in the presence of formaldehyde and of an ammonium salt no hexamethylenetetramine is formed in the living protoplasm" this product is formed, because he found by microchemical experiments that not only ammonia but also ammonium salts form hexamethylenetetramine. The test was made with iodine-potassium iodide solution by which characteristic microscopic crystals are produced.—H. Engelhardt.

METABOLISM (NITROGEN RELATIONS)

634. AUBEL, E. Influence de la nature de l'aliment carboné sur l'utilisation de l'azote par le *Bacillus subtilis*. [The influence of the carbon nutrients on the utilization of nitrogen by *Bacillus subtilis*.] Compt. Rend. Acad. Sci. Paris 171: 478-480. 1920.—More nitrogen is absorbed when this organism is grown on glycerine than when on glucose or levulose.—C. H. Farr.

635. BOS, E. C. VAN DEN. Action stimulante des sels azotés sur la germination de l'*Amarantus caudatus*. [Stimulation of germination in *Amarantus caudatus* by nitrogen-containing salts.] Recueil Trav. Bot. Neerland. 17: 69-120. 1920.—At a temperature of 15-16°C. the seeds germinate only in darkness. When the maximum temperature is almost reached, they germinate at 43-45°C. in the light only, though the seedlings never attain their full development.—In a Knop solution the germination was found to be more rapid, which suggested the action of nitrogen. A solution of 0.1 m. KNO_3 had an unfavorable influence, while 0.001 m. KNO_3 was more favorable. In some salts NO_3 proved to be stimulating whereas Cl and SO_4 -ions were not.—Solutions of KSCN of 0.4 m. gave a maximum germination of 80 per cent. Such compounds as asparagin and urea did not stimulate germination.—J. C. Th. Uphof.

636. LEWIS, W. C. MCC. [Rev. of: ROBERTSON, T. BRAILSFORD. The physical chemistry of the proteins. xv + 483 p. Longmans, Green & Co.: New York, 1918.] Sci. Prog. [London] 14: 502-503. 1920.

637. LÜERS, H. Über die Identität von Hordein und Bynin. [The identity of hordein and bynin.] Biochem. Zeitschr. 96: 117-132. 1919.—Hordein of barley and bynin of malt were hydrolyzed according to the methods of VAN SLYKE to determine the relationships of these products. The author's analyses lead him to conclude that bynin is not a new protein differing from hordein in its properties, as OSBORNE believes, but that it is more likely a residuum.—W. W. Bonns.

638. PHEILER, W., UND F. ENGELHARDT. Ueber den Nachweis von Rizin in Füttermitteln mit Hilfe der serologischen (Präzipitations—Komplementablenkings und Konglutinations) Methoden sowie der Hämagglutination. [The identification of ricin in feedstuffs by means of serological methods, as well as the haemagglutination method.] Landw. Jahrb. 35: 561-583. 1919.—The author has investigated especially the method recommended by MIESSNER and REWALD and condemned as not specific by BIERBAUM. The author finds that the method is highly specific, when a proper antiserum is used. Investigations on the other methods are reported but the author concludes that properly used the precipitation method is specific and convenient.—A. J. Pieters.

639. ROUSSEAU, EUG., ET SIROT. Les matières azotées et l'acide phosphorique dans la maturation et la germination du blé. [The nitrogen compounds and phosphoric acid during the ripening and germination of wheat.] Compt. Rend. Acad. Sci. Paris 171: 578-580. 1920.—During the ripening of wheat the proportion of nitrogen to phosphoric acid, P_2O_5 , remains about constant. Both decrease until early July, whereafter they increase to some extent. Acidity is found to maintain a considerable decrease until the last of July.—C. H. Farr.

640. SERTZ, H. Über die Veränderung der Stickstoffformen in keimender Lupine, insbesondere über das Verhältnis von formoltitrierbarem und Formalinstickstoff zum Gesamtstick-

stoff. [The nitrogen changes in germinating lupines with special reference to the relation of formol-titratable and of formalin nitrogen to total nitrogen content.] *Biochem. Zeitschr.* 93: 253-254. 1919.—A brief note on the Sørensen formol titration method, showing that in the presence of neutral aqueous formaldehyde solution, plant albumins, albuminates, and hemi-albumoses are practically insoluble, while formalin nitrogen, peptone, diastase, etc., remain soluble. Progressive germination gave increased values of formol-titratable nitrogen (soluble amino acids), and a corresponding falling off in formalin nitrogen (insoluble protein). The sum of the values obtained approximates the total nitrogen content.—*W. W. Bonns.*

METABOLISM (ENZYMES, FERMENTATION)

641. BOKORNY, T. *Bindung des Formaldehyds durch Enzyme.* [Formaldehyde fixation by enzymes.] *Biochem. Zeitschr.* 94: 69-77. 1919.—Reviewing briefly some results of NEUBERG showing variation in inhibitory effects of different concentrations of formaldehyde on various enzymes, and in the effects of the same concentration on different enzymes, Bokorny accounts for these on the theory of differences in molecular structure of enzymes, with corresponding difference in chemical reactions with formaldehyde. Quantitative data are presented showing the effect of formaldehyde on emulsin, based upon the formation of hexamethylenetetramine when formaldehyde reacts with ammonia, $6 \text{ HCOH} + 4 \text{ NH}_3 = 6 \text{ H}_2\text{O} + \text{C}_6\text{H}_{12}\text{N}_4$. Any excess ammonia is titrated against sulphuric acid. Treating 1 g. emulsin with 50 cc. 0.925 per cent formaldehyde for 3 days showed a formaldehyde combination of 11-38 per cent of the dry weight of the enzyme. The results cited are followed by the author's views on the protein nature of the enzyme, as indicated by its amphoteric properties, combination with acids, bases, etc.—*W. W. Bonns.*

642. BOURQUELOT, EM., M. BRIDEL, ET A. AUBRY. *Synthèse biochimique du cellobiose à l'aide de l'émulsine.* [Biochemical synthesis of cellobiose by means of emulsin.] *Jour. Pharm. et Chimie* 21: 129-132. 1920.—Cellobiose or cellose is a glucobiose and is isomeric with gentiobiose and maltose. The authors succeeded in synthesizing this sugar by allowing emulsin to act on a 50 per cent aqueous solution of glucose. The formation is probably due to the fact that emulsin does not appear to be a uniform ferment but to be composed of gentiobiase, cellobiase, and beta-glucosidase.—*H. Engelhardt.*

643. BRIDEL, M. *Sur la résistance des ferments de l'émulsine à l'action prolongée de l'alcool méthylique à 70 p. 100.* [The resistance of emulsin toward the prolonged action of 70 per cent methyl alcohol.] *Jour. Pharm. et Chimie* 22: 323-327. 1920.—Seventy per cent methyl alcohol did not destroy the fermentative power of emulsin on beta-glucosides, lactose, and beta-ethyl-galactoside within 5 years. The strength, however, had been considerably reduced. The ferments acting on lactose and beta-ethyl-galactoside appear to be more resistant than beta-glucosidase.—*H. Engelhardt.*

644. FALK, K. G. *The chemistry of enzyme actions.* *Amér. Chem. Soc. Monogr. Ser.* 136 p. Chemical Catalog Co.: New York, 1921.—This constitutes the first of a series of monographs proposed by the American Chemical Society. These monographs are designed to serve two purposes, (1) to present in readable form for those who may not be specialists in the particular field the knowledge available on the selected topic, and (2) through a well digested survey of the present status of the problem to promote and facilitate research. The author is convinced that enzyme studies make contributions not merely to the "chemical phenomena underlying living matter" but also to "a better understanding of the fundamental chemical relations underlying an exact knowledge of chemical reactions."—He recognizes 2 methods of attack, briefly, (1) enzymes as catalysts, modifying reaction velocities (the kinetics of enzyme action), and (2) the chemical nature of enzymes and their reactions. He purposes to indicate the progress attained by these 2 methods, and proceeds to develop the subject under the following captions: Velocities of chemical reactions; general theory of chemical reactions, catalysis; chemical reactions catalyzed by enzymes; physical properties common to enzyme preparations; chemical properties common to enzyme preparations; chemical

nature of certain enzymes; mechanism of enzyme actions; uses and applications of enzymes; and the present status of the enzyme problem.—It is recognized by the author that the subject matter may not be presented in a completely rounded and final form; but it is intended to be adequately comprehensive, and to a large degree supplementary to existing works, emphasizing particularly in how far enzyme reactions may be, or have been shown to be, analogous to other chemical changes. The literature of recent work is freely cited.—*B. M. Duggar.*

645. JACOBY, M. Über Bakterien-Katalase. III. [Bacterialcatalase. III.] Biochem. Zeitschr. 95: 124-130. 1919.

646. KOCH, A., UND A. OELSNER. Über die Betainspaltung durch die Bakterien des Melasseschlempedüngers "Guanol." [The bacterial splitting of betain in the molasses-waste fertilizer Guanol.] Biochem. Zeitschr. 94: 139-162. 1919.—The authors have studied the organisms concerned with the splitting of betain in a commercial "Guanol" fertilizer produced from molasses waste. These comprised various forms to be found in compost,—mold organisms forming trimethylamine and a bacterium which the authors designate as *Betainobacter α*. The latter was studied in some detail and was found to split off all the nitrogen of the betain molecule as NH_3 , using for itself only a small portion. Methyl alcohol, formic acid, and acetic acid were noted as intermediate disintegration products.—*W. W. Bonns.*

647. NĚMEC, A. Über die Verbreitung der Glycerophosphatase in den Samenorganismen. [The distribution of glycerophosphatase in seeds.] Biochem. Zeitschr. 93: 95-100. 1919.—The author has determined the presence of the enzyme in the seeds of 20 species, using the method of NEUBERG and KARZAG. The substrate used was a 1 per cent solution of sodium glycerophosphate (Merck), the total P_2O_5 being determined, and macerated seed material was allowed to act upon the phosphate solution under controlled conditions. Results are given in P_2O_5 split off. The necessary controls were determined. The values given in the author's table show that of the seeds used the cereals possess the least hydrolytic activity. Legumes show high enzyme content, differing considerably with the species. Plants of *Lens* and *Pisum* were more active than those of *Lupinus* and *Vicia*. The crucifers (*Brassica*, *Raphanus*, and *Sinapsis*) are especially rich in the enzyme, the latter splitting off more than 41 per cent P_2O_5 . The maximum activity was observed in the soy bean, which hydrolyzed almost 50 per cent of the glycerophosphate supplied. In general, seeds rich in oil are higher in enzyme activity of the kind here studied than the albuminous seeds, and the latter in turn have greater hydrolytic power than starchy seeds.—The fact that the P_2O_5 set free in no case exceeded 50 per cent of the amount present in the substrate leads the author to the belief that the enzyme present acts only on the naturally occurring *d*-glycerophosphoric acid. Thermolability of the enzyme at 100°C . was established.—*W. W. Bonns.*

648. NORTHROP, JOHN H. The influence of hydrogen ion concentration on the inactivation of pepsin solutions. Jour. Gen. Physiol. 2: 465-470. 1920.—Pepsin in solution at 38°C . was found to be most stable at a hydrogen-ion concentration of P_H 5.0. An increase above this point resulted in a slow increase in the rate of destruction of the pepsin, while a decrease resulted in a rapid increase in the rate of destruction. Neither the impurity of the enzyme, nor the anion of the acid affected appreciably the rate of destruction. There seemed to be no relation between optimum range of hydrogen-ion concentration for digestion and the destruction of the enzyme.—*Otis F. Curtis.*

649. NORTHROP, JOHN H. The effect of the concentration of enzyme on the rate of digestion of proteins by pepsin. Jour. Gen. Physiol. 2: 471-498. 1920.—The rate of protein digestion is not always proportional to the total concentration of pepsin. It is suggested that this may be due to inactivation of some of the enzyme by combination with some product of the reaction, perhaps peptone, and that this inactivation is quantitatively expressed by the law of mass action. The rate of reaction is, therefore, proportional to the quantity of active

enzyme, not total enzyme. The hypothesis has been put in the form of a differential equation and found to agree quantitatively with the experimental results when the concentration of pepsin, peptone, or both is varied. An integral equation is obtained which holds for the entire course of digestion with varying enzyme concentration. Many analogies between the action of pepsin on albumen and the action of toxins on organisms are pointed out.—*Otis F. Curtis.*

650. STAEHELIN, M. Die Rolle der Oxalsäure in der Pflanze. Enzymatischer Abbau des Oxalations. [The rôle of oxalic acid in plants. The splitting off of the oxalate ion by enzyme action.] *Biochem. Zeitschr.* 96: 1-49. 1919.—This is a detailed study of the enzyme in various plants capable of hydrolyzing oxalic compounds. A brief review of previous work dealing with acid metabolism of succulents is presented. The author sets out to determine the following points: (1) The distribution of the enzyme in different types of plants, that is, in nonsucculents and succulents of widely differing genera, (2) determination of an oxalate enzyme in acid-free plants, (3) distribution of the enzyme in the plant tissues, and (4) the kinetics of the reaction.—The objects studied covered chlorophyllous cryptogams and phanerogams, both in green and etiolated stages. In general the experimental methods comprised the incubation of the enzyme-containing plant powder with a solution of an oxalic acid salt, preferably ammonium oxalate. At the close of the experiment the residual oxalate was quantitatively determined. CO₂ determinations were made with standard Pettenkoffer and titration methods.—The chief results are as follows: Green leaves, stems, roots, etiolated organs, and chlorophyll-free seeds of all plants studied contained an oxalate-hydrolyzing enzyme. The pressed out juice as well as the powder precipitated by alcohol, possessed enzyme activity (*Helianthus* leaves). This action is greatest between 30 and 40°C., and is in large measure dependent upon oxygen supply. It is completely inhibited in an atmosphere of hydrogen. Increased oxalate concentration is correlated with a relative decrease in hydrolysis, hydrolysis increasing with the square root of the enzyme increase (rule of Schütz). With a preparation of *Rumex* leaves, enzyme action conforms to a mono-molecular equation, while with a powder from *Helianthus* leaves there is a deviation from the law of auto-catalysis. The enzyme is an oxidase, and appears to have the properties of a carboxylase. The oxalate ion is not completely oxidized by the enzyme to CO₂ (doubtful in case of *Pisum*). Other disintegration products were not determined.—*W. W. Bonns.*

651. WOHLGEMUTH, J. Über neue Theorien der Diastasebildung und Diastasewirkung. [On new theories of diastase formation and action.] *Biochem. Zeitschr.* 95: 212-224. 1919.—A discussion of the work of G. WOCHER, supplemented by a brief account of experiments, opposing the conclusions of Wocher that formaldehyde exerts an enzyme-like action on starch, similar to diastase action.—*W. W. Bonns.*

METABOLISM (RESPIRATION)

652. CERIGHELLI, RAOUL. Sur les échanges gazeux de la racine avec l'atmosphère. [The gaseous exchange between roots and atmosphere.] *Compt. Rend. Acad. Sci. Paris* 171: 575-578. 1920.—A study of attached and detached roots in which the oxygen intact and the carbon dioxide liberation was determined. The $\frac{\text{CO}_2}{\text{O}_2}$ ratio has a value varying from 0.7 to 1.0 according to the species. Respiration is higher in free humid air than in confined or dry atmosphere. In the case of a confined atmosphere such as occurs normally in the soil the CO₂ is retained in the tissues. In dry open air the ratio however is the same as in free humid air although the amount of gases exchanged is decreased.—*C. H. Farr.*

653. LANGDON, S. C., AND W. R. GALEY. Carbon monoxide a respiration product. *Sci. Amer. Monthly* 1: 508-510. 3 fig. 1920. [Reprinted from *Jour. Amer. Chem. Soc.*, 42: 641-646. 1920.]—The existence of several per cent of carbon monoxide gas in the pneumatocyst (i.e., floater) of the giant Pacific Coast kelp, *Nereocystis luetkeana*, is confirmed. It is concluded that this is formed as a product of respiration rather than as an intermediate step in photosynthesis.—*Chas. H. Otis.*

654. HERZFELD, E., UND R. KLINGER. *Chemische Studien zur Physiologie und Pathologie VI. Zur Biochemie der Oxydationen.* (Zellatmung; Oxydations-fermente; zur Theorie der Narkose.) [Chemical studies in physiology and pathology VI. The biochemistry of oxidation. (Respiration; oxidases; narcosis).] *Biochem. Zeitschr.* 93: 324-352. 1919.—This is a critical discussion based upon the work of others. The author stresses the possibility that certain molecular structures may weaken the union of the O atoms in the oxygen molecule so that "activation" (increased oxidizing power) results, whereby loose chemical combinations are made with H₂O or with metals with peroxide-like structure, with OH ions, and with O₂-adsorbing surfaces. Such organic compounds as the lower fatty acids or their salts might be oxidized to CO₂ and H₂O, fulfilling the conditions for oxidation processes in the living organism, namely, active O₂ and easily oxidizable simpler metabolic products, rendering the assumption of certain oxidases unnecessary.—It is stated that 'Narcosis depends upon the disturbance of the formation or the adjustment of differences in physiological potential upon which the activity of the nervous system rests. Widely different compounds can effect this, depending upon a loose combination (adsorption) with the nerve substance. Certain narcotics (CO₂, N₂O) act by means of acid accumulation in the tissues. This may be the mode of action of the lipoid-soluble narcotics, correlated with an inhibition of oxidative processes. Neither for the latter group nor for narcotics in general is the inhibition of oxidation the sole or the most probable controlling factor of action.'—W. W. Bonns.

ORGANISM AS A WHOLE

655. REED, H. S. Conditions affecting the potentiality of the seed. [Rev. of: KIDD, F., and C. WEST. *Physiological predetermination: the influence of the physiological condition of the seed upon the course of subsequent growth and upon the yield.* *Ann. Appl. Biol.* 5: 1-10, 112-142, 157-170, 220-251. 1918-1919; 6: 1-26. 1919.] *Plant World* 22: 363-364. 1919.—Various questions indicated by the title are "discussed in a spirit which cannot fail to be stimulating to all further work in this important field."—C. H. Shull.

656. STILES, W. *Plant physiology.* *Sci. Prog.* [London] 14: 392-396. 1920.—A brief review of some of the more recent papers dealing with the effect of light, temperature, and humidity on the development of plants.—J. L. Weimer.

GROWTH, DEVELOPMENT, REPRODUCTION

657. CHURCH, MARGARET B. *Root contraction.* *Plant World* 22: 337-340. 1 fig. 1919.—A general review of literature on root contraction is given, and the facts summarized as follows: Roots do shorten; the parenchyma tissue of the root is the active tissue; cork and vascular traces are passive; the cork is crushed by contraction ultimately; there is a region where wrinkling and shortening both occur, another where shortening but no wrinkling is visible, and an unchanged region; dicotyledons show distorted bundle traces, while monocotyledons have bundles that remain straight during contraction. The author suggests the desirability of study of serial sections coupled with consideration of turgor changes and biochemical alteration of the protoplast and cell walls.—Charles A. Shull.

658. JONES, W. NEILSON. *A simple root auxanometer.* *Ann. Bot.* 34: 555-557. 1 fig. 1920.—The apparatus consists of a cylindrical glass jar provided with a stopper in which slides a glass rod. The root of a seedling impaled on a pin also sliding through the stopper, is adjusted to touch exactly the surface of water partly filling the jar, and the height of the rod, which dips into the water, is noted. After an interval the water is lowered and the tip readjusted by withdrawal of the rod, the amount of which withdrawal divided by the ratio of the cross section of jar to rod gives the growth in that interval. The exactness with which the contact of a tip with a water surface can be seen, and the great difference possible in the cross sections of rod and jar, render the apparatus very sensitive in principle. Suggestions are added for more exact calibration and compensation of evaporation.—W. F. Ganong.

659. KUIPER, K., JR. Koolsuurbemesting nachtverlichting en andere groeibevorderende factoren in de plantenteelt. [Effects of carbon dioxide manuring, night illumination, and other growth-stimulating factors upon plant culture.] *Cultura* 32: 332-344, 355-368. 1920.—A general review is given of experiments on the above subjects done by various investigators. The bibliography comprises 41 titles.—J. C. Th. Uphof.

660. REED, H. S. The nature of the growth rate. *Jour. Gen. Physiol.* 2: 545-561. 1920.—This paper is concerned with the application of the equation of an autocatalytic reaction to the growth of shoots of 3 year old pears (*Pyrus communis*), seedlings of *Juglans nigra*, and scions of *Juglans regia* grafted on *Juglans nigra*. The equation is applied also to data obtained by KREUSLER on growth of maize as well as to data presented by ECKLES and SWETT on the growth of Jersey heifers. The author finds a correspondence between the growth rate and rate of an autocatalytic reaction, and considers that the growth of an organism may be considered as a chemical reaction and that the growth rate for any moment is proportional to the growth yet to be made.—L. Knudson.

661. SAITO, KENDO. Über die chemischen Bedingungen der Askenbildung bei *Zygosaccharomyces major* Takahashi et Yukawa. [Chemical conditions for ascus formation in *Zygosaccharomyces major*.] *Bot. Mag. Tōkyō* 32: 1-13, 15-25. 1918.—It has been previously shown that *Zygosaccharomyces* forms no spores when grown on the usual gypsum blocks; but it has also been determined that on "soja bean sauce" with NaCl content of 5 per cent, and suitable temperature, abundant asci with spores are produced in 5-12 days. The author now shows that well nourished cultures produce a fine yield of asci and spores in 2-4 days on gypsum blocks moistened with 0.5 dextrose and 4-10 per cent NaCl. Testing 73 substances, including primarily inorganic and organic salts, carbohydrates, and certain amino acids, it is found that many inorganic and some organic salts used in concentrations of 0.5-1.5 m., in conjunction with 0.5 per cent dextrose, produce the same action; but in general non-electrolytes are of no value, or of slight comparative value. Many neutral salts of metals were, of course, toxic, and alkaline and acid salts often so in consequence of the reactions.—The addition of relatively little acid or alkali to the NaCl-dextrose cultures causes inhibition of the process, likewise all ammonium salts are inhibitory. Combinations of nutrient salts are entirely favorable. In part at least the morphogenic stimulus in ascus formation is the nutrient relation of the surrounding medium.—B. M. Duggar.

MOVEMENTS OF GROWTH AND TURGOR CHANGES

662. BOSE, J. C. Researches on growth of plants. I, II. *Nature* 105: 615-617, 648-651. *Fig. 1-6*. 1920.—The author discusses tropic movements in general, especially geotropism and heliotropism.—O. A. Stevens.

663. RICHME, H. Action de la pesanteur sur les végétaux. [The effect of weight on plants.] *Compt. Rend. Acad. Sci. Paris* 171: 261-263. 1920.—It is suggested that negative geotropism may be due to the weight of the terminal portion of the plant causing a compression below which stimulates growth and a tension above which retards it. This condition is indicated by the longitudinal splitting of geotropically stimulated stems. It is thus concluded that the plant exhibits a perception of weight.—C. H. Farr.

664. SPRUIT, C. The influence of electrolytes on the tactical movements of *Chlamydomonas variabilis* Dangeard. *Recueil Trav. Bot. Néerland.* 17: 129-204. *Fig. 1-7*. 1920.—Colloid chemical representations can be made of the influence of chemotactic agents. With *Chlamydomonas variabilis* there was observed a clear positive geotaxy, whereas other investigators have found *C. pulvisculus* to be negatively geotactic. Reaction to gravity ceases after adding to the water small quantities of acid, base, or salt. The susceptibility to light, like that to gravity, is diminished under the influence of added electrolytes. Besides a negative phototactic reaction a positive reaction may also occur. Thigmotactic response is manifest only in solutions which are not distinctly alkaline.—It was possible to produce an oxygen-line in the dark under a cover glass. By means of *Spirillum* sp. it was shown that under the

influence of carbonic acid a removal of the oxygen-line was effected. It was found possible to calculate the critical concentration where theoretically the transition of quick to slow movement took place. Motility was judged by means of the reaction to gravity.—On account of the great influence of H ions and OH ions the solutions were regularly changed. The solutions were used in a graded series, in each of which the H-ion concentration was constant. Salt solutions with gradations in H-ion concentrations were obtained by adding small quantities of acid or base. With acetate solutions, the fluids were made acid with acetic acid; in this case "buffer solutions" were obtained, which offered special advantages. The H ions and the OH ions have much influence on the movements of *Chlamydomonas*. Mixtures of sodium acetate with acetic acid and with potassium hydroxide in which the amount of acetate was constant were used. For KCl an important change of sensibility was observed, while with K_2SO_4 and KNO_3 the differences were insignificant.—The isoelectric point of the plasma colloids was calculated to be in weakly alkaline solutions. Two phenomena which might give further information about the place of the isoelectric point were the sticking of the organisms to the glass and also the sticking together of the algae by means of their cilia. The first phenomenon took place in solutions more acid than the isoelectric point of the plasma colloids, a fact attributed to the negative charge on the glass in alkaline, neutral, and very weakly acid solutions. Under the influence of light or of gravity the cilia of these algae came continually into contact with the glass, thus making it possible to acquire or lose an electrical charge. It was pointed out that the acid optimum of *Chlamydomonas* in chemotactic experiments is probably an acid optimum only under the influence of the glass.—*J. C. Th. Uphof.*

GERMINATION, RENEWAL OF ACTIVITY

665. COUPIN, HENRI. Sur la résistance de plantules à l'inanition. [On the resistance of seedlings to starvation.] *Compt. Rend. Acad. Sci. Paris* 171: 550-551. 1920.—Seedlings of 17 types of plants were left in the dark chamber after germination and the period elapsing before death occurred was noted. The species which lasted longest was the piñon pine, which did not die until after 60 days. The plants which succumbed first were those of alfalfa, which died in 15 days.—*C. H. Farr.*

666. NOBBE, F. Untersuchungen über den Quellprozess der Samen von *Trifolium pratense* und einiger anderer Schmetterlingsblütler. [Investigations regarding the swelling process in the germination of seeds of *Trifolium pratense* and other papilionaceous plants.] *Landw. Versuchssta.* 94: 197-218. 1919.—The capacity of clover seed to swell and germinate, over a period of forty years, is shown. Data are presented showing the effect of the climate under which the seeds are produced, the color, and size on the swelling capacity. The germination of the seeds of some wild papilionaceous plants can be largely increased by vigorous rubbing with sand. The action of alternate swelling and drying as well as the significance of the seed coat in germination is discussed.—*G. M. Armstrong.*

667. JÖRGENSEN, I., AND W. STILES. Some scientific aspects of cold storage. *Sci. Prog.* [London] 14: 427-434. 1920.—A consideration of the effect of slow and rapid freezing and thawing upon the water content of certain plant and animal tissues.—*J. L. Weimer.*

668. WEISS, H. The heat resistance of spores with special reference to the spores of *B. botulinus*. *Jour. Infect. Diseases* 28: 70-92. 1921.—The free spores of *B. botulinus* are destroyed within 5 hours at 100°, within 40 minutes at 105°, and within 6 minutes at 120°C.. the thermal death point being determined under optimum conditions for survival. The destruction of the spores is a gradual process, probably due to a gradual protein coagulation, the spores being injured before they are killed, as inferred from the fact that the longer the period of heating before the spores are killed, the longer the period required for those spores to germinate. Young moist spores have a higher thermal resistance than old moist spores. The hydrogen-ion and hydroxyl-ion concentrations as well as sodium chloride considerably lower the thermal resistance, the lowering increasing with the increase in concentration of the ions or of the salt.—*Selman A. Waksman.*

TOXIC AGENTS

669. BERCZELLER, L. Über Adsorption und Adsorptionsverbindungen V. Die Adsorptionsverbindungen des Kupferhydroxyds. [Adsorption and adsorption compounds V. The adsorption compounds of copper hydroxide.] *Biochem. Zeitschr.* 93: 230-236. 1919.

670. GUÉRITHAULT, B. Sur la présence du cuivre dans les plantes et particulièrement dans les matières alimentaires d'origine végétale. [On the presence of copper in plants and especially in foods of vegetable origin.] *Compt. Rend. Acad. Sci. Paris* 171: 196-198. 1920. —A description of the methods used in the determination of the amount of copper in plant tissues. Analyses of 44 types of plants are given in which the amount of copper in the ash varied from 63.6 per cent in sweet almond to 8.7 per cent in radish.—C. H. Farr.

671. MAQUENNE, L., ET E. DEMOUSSY. Sur la toxicité du fer et les propriétés antitoxiques du cuivre vis-à-vis des sels ferreux. [On the toxicity of iron and the antitoxic properties of copper in the presence of ferrous salts.] *Compt. Rend. Acad. Sci. Paris* 171: 218-222. 1920. —Iron salts in culture solutions are often altered into salts which are precipitated and which in themselves are not toxic, but give rise to a toxic acid. Peas grown in a culture medium in which iron and CaSO_4 were present showed the maximum growth. Growth decreases as the iron content is increased. A considerable growth occurs if KH_2PO_4 and CaSO_4 are both present. Ferrous salts are found to be always injurious, whereas ferric salts stimulate growth if used in small amounts. Iron alum and ferric oxide retard growth in all parts of the plant except in the stem, which is slightly stimulated.—C. H. Farr.

672. TRAUBE, J., UND H. ROSENSTEIN. Über die Wirkung von oberflächenaktiven Stoffen auf Pflanzensamen. [The action on seeds of compounds affecting surface tension.] *Biochem. Zeitschr.* 95: 85-100. 1919.—Seeds of cereals after preliminary water imbibition were subjected to the various organic compounds known to modify surface tension. In the case of volatile agents the seeds were exposed to the vapors; otherwise they were placed in the liquid. The results were noted in terms of per cent of germination and amount of growth.—In general the work of earlier investigators is confirmed, that is, a variation from stimulation to inhibition is correlated with increase in time of exposure to the agent. Narcotics, such as chloroform, ethyl ether, urethane, etc., showed a range of action conforming, over a series, to their effect as animal narcotics. With respect to germination and growth processes the phenomena of reversibility and irreversibility of narcosis as well as of stimulation were established.—Similar data were obtained for a series of disinfectants, such as cresol and naphthalene. The higher fatty acids, caproic and caprylic, were strongly stimulative to germination when applied in small doses.—W. W. Bonns.

673. WIENTJES, K. Accélération de la germination sous l'influence des acides. [Influence of acids upon germination.] *Recueil Trav. Bot. Néerland.* 17: 33-68. 1920.—The influence of HCl , H_2SO_4 , oxalic acid, and tartaric acid upon the germination of seeds of *Phacelia tanacetifolia*, *Solanum Lycopersicum*, *Alisma Plantago*, *Epilobium hirsutum*, and *Lythrum Salicaria* was determined.—There was no influence on *Phacelia*, *Alisma*, *Epilobium*, and *Lythrum*, but with *Solanum* some acceleration of germination was observed.—J. C. Th. Uphof.

ELECTRICITY AND MECHANICAL AGENTS

674. ANONYMOUS. Difference of potential in biology. *Sci. Amer. Monthly* 2: 122. 1920. —An account of a report presented to the Société de Biologie, Paris, March 13, 1920. It concerns experiments on the electric phenomena associated with certain physiological processes of plants and animals.—Chas. H. Otis.

SOIL SCIENCE

J. J. SKINNER, *Editor*F. M. SCHERTZ, *Assistant Editor*

(See also in this issue Entries 9, 13, 14, 20, 24, 25, 28, 34, 92, 93, 97, 108, 557, 604)

675. ANONYMOUS. Fertilizers and parasiticides. [Rev. of: COLLINS, S. H. *Chemical fertilizers and parasiticides*. xii + 273 p. Baillière, Tindall, and Cox: London, 1920.] *Nature* 106: 206-207. 1920.—Review refers to fertilizers only.—O. A. Stevens.

676. BEALS, COLONZO C. Soil survey of Cass County, Indiana. *Proc. Indiana Acad. Sci.* 1918: 186-204. 1920.—The upland soils are of the Clyde, Miami, and Dunkirk type. Muck also is present. The principal crops are corn, wheat, oats, clover, timothy, and potatoes. The paper is largely descriptive.—F. M. Schertz.

677. CARR, R. H., AND LEROY HOFFMAN. The relation of nitrogen, phosphorus and organic matter to corn yield in Elkhart County, Indiana. *Proc. Indiana Acad. Sci.* 1918: 160-165. *Soil map*. 1920.—About 50 per cent of the soils of this county are of the Miami loam and Miami sandy loam types and about 27 per cent are of the Plainfield sandy loam type. These soils are low in organic matter and 51 per cent are acid. Crop yield bears a close relation to the organic matter present and this in turn is closely associated with the amounts of nitrogen and phosphoric acid present. Three samples show that good crops are not always obtained from soil with the requisite plant food content. The difference in yield between the 0.2 per cent and the 8-10 per cent organic matter in soils averages 25.6 bushels. In average field conditions for each increase of 2672 lbs. of organic matter, 71.6 lbs. of nitrogen, and 35.7 lbs. of phosphoric acid per acre (2,000,000 lbs.) there is an increase of 1 bushel of corn.—F. M. Schertz.

678. CARR, R. H., AND V. R. PHARES. Analyses of one hundred soils in Allen County, Indiana. *Proc. Indiana Acad. Sci.* 1918: 151-159. *Soil map, pl. 1-3*. 1920.—The soils are of glacial origin, 70 per cent belonging to the Miami series and 18.5 per cent to the Clyde series. Determinations of the volatile organic matter, phosphoric acid, and nitrogen were made. In organic matter, 11 per cent of the soils had less than 4 per cent; 45 per cent of the soils ranged from 4 to 7 per cent; 37 per cent from 7 to 15 per cent; and 6 per cent were above 15 per cent. Each per cent increase in organic matter carried with it an increase of 519 lbs. of nitrogen and 72 lbs. of phosphoric acid per acre. Charts show that nitrogen has more influence on high corn yields than has phosphoric acid. Fifty-five per cent of the soils were acid to litmus, a condition causing "clover sickness."—F. M. Schertz.

679. HOFFMANN. Düngungsversuche mit neuzeitlichen Stickstoffsalzen im Erntejahr 1920. [Fertilizer experiments with new nitrogen salts in 1920.] *Mittell. Deutsch. Landw. Ges.* 36: 26. 1921.—The author brings together in tabular form the records of cooperative fertilizer experiments with various salts of nitrogen.—A. J. Pieters.

680. NOYES, H. A., AND G. L. GROUNDS. Number of colonies for a satisfactory soil plate. *Proc. Indiana Acad. Sci.* 1918: 93-101. *Pl. 1-2, fig. 1-7*. 1920.—Tests have shown that 30 colonies of bacteria is the optimum number for a petri dish 100 mm. in diameter. Plates carrying between 10 and 100 colonies are satisfactory for computing bacterial counts.—F. M. Schertz.

681. NOYES, H. A., EDWIN VOIGT, AND J. D. LUCKETT. The length of time to incubate petri plates. *Proc. Indiana Acad. Sci.* 1918: 102-109. 1920.—Counts made after 10 days' incubation at 20°C. from bacterial dilutions of soil gave reliable results for the bacterial content of the soil, provided the number of bacteria present was small enough to allow all bacteria to develop into colonies. The rapidity with which bacteria develop into colonies varies with the soil and is influenced by soil temperature, moisture, and aeration.—F. M. Schertz.

682. TRUFFAUT, G., ET N. BEZSSONOFF. Étude comparée sur la microflore et la teneur en azote des terres partiellement stérilisées par le sulfure de calcium. [A comparative study of the microorganisms and the nitrogen content of soils partially sterilized by CaS.] Compt. Rend. Acad. Sci. Paris 171: 268-271. 1920.—Soils treated with CaS are found to contain much nitrogen and also *Clostridium pastorianum* and the principal ammonifiers of the soil. When CaS is used in amounts of 150 kg. per hectare in the field the soil is not found to be low in nitrogen.—C. H. Farr.

TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, *Editor*

E. B. PAYSON, *Assistant Editor*

(See also in this issue Entries 146, 208, 229, 232, 377, 433)

GENERAL

683. ANONYMOUS. [Rev. of: HITCHCOCK, A. S., AND P. C. STANDLEY. *Flora of the District of Columbia*. Contrib. U. S. Nation. Herb. 21: 1-329. 42 pl. 1919.] Nature 105: 242. 1920.

684. ANONYMOUS. [Rev. of: SCHOOLBRED, W. A. *The flora of Chepstow*. x + 140 p. Taylor & Francis: London, 1920.] Jour. Botany 58: 178-180. 1920.

685. ANONYMOUS. [Rev. of: STONE, WILMER [WITMER]. *The use and abuse of the genus*. Science 51: 427-428. 1920.] Jour. Botany 58: 196-197. 1920.

686. BENNETT, ARTHUR. [Rev. of: LINDMAN, C. A. M. *Svensk Fanerogamflora*. viii + 639 p., 300 illus. P. A. Norstedt & Söners: Stockholm, 1918.] Jour. Botany 58: 153-156. 1920.—See Bot. Absts. 8, Entry 727.

687. BRITTON, NATHANIEL LORD. *Flora of Bermuda (Illustrated)*. 8 vo., 585 p., 1 pl. (colored), 519 fig. Charles Scribner's Sons: New York, 1918.—The present comprehensive work includes the four great phyla of the vegetable kingdom. The Spermatophyta and Pteridophyta have been elaborated by the author. The chapters on the lower groups have been contributed by specialists, as follows: Musci by ELIZABETH G. BRITTON, Hepaticae by ALEXANDER W. EVANS, Lichenes by LINCOLN W. RIDDLE, Fungi by FRED J. SEAVER, and the Algae by MARSHALL A. HOWE. In the case of the Spermatophyta, Pteridophyta, and Bryophyta keys are given which lead to the orders, families, and genera; and under the larger genera keys are also given to the species. Ample descriptions accompany each category, and a limited synonymy is cited. Text-figures well illustrate distinctive species of the more important genera. Neither keys nor illustrations are given for the Thallophyta. No new species, new combinations, nor new names of the higher plants are published in the present volume. The following species of algae are new to science: *Boddlea struveoides* Howe, *Dasya Collinsiana* Howe, *Callithamnion Herveyi* Howe, *Seirospora purpurea* Howe, *Ceramium leptozonum* Howe, and *Nemastoma gelatinosum* Howe. The author adds a chapter on "Bibliography," and one on the "Principal botanical collections made in Bermuda."—J. M. Greenman.

688. EWART, A. J. Contributions to the flora of Australia, No. 27. Proc. Roy. Soc. Victoria N.S., 31: 367-378. Pl. 18. 1919.—In connection with work on names of Victorian plants questions arose as to priority and especially as to whether the plants were really native. The decisions and references to the evidence are given for about fifty cases. OSTENFELD's revision of the annual species of *Triglochin* and a key based on his, but including the recognized Australian species, both annuals and perennials, is given.—Some measurements of girth-growth in one tree of *Ulmus campestris* L. are appended. The girth did not increase

from July to October, it began to increase in November, was greatest from mid-December to the end of February, remained constant from January to March, decreased 0.2 to 0.3 inches during April, and again remained constant during May and June. Sections showed that cambial growth began a month before girth increase was measurable. Figures of the parasitic activities of *Cassytha melantha* are given.—*Eloise Gerry*.

689. G[ONZÁLEZ] F[RAGOSO], ROMUALDO. [Rev. of: BARNOLA, P. J. M. DE. *Flora vascular del Principado de Andorra*. [Vascular flora of the Principality of Andorra.] Soc. Iber. Cien. Nat. Mem. I. Zaragoza, 1919.] Bol. R. Soc. Española Hist. Nat. 19: 486. 1919.

690. NAKAI, TAKENOSHIN. *Notulae ad plantas Japoniae et Koreae*, XXII. [Notes on plants of Japan and Korea, 22.] Bot. Mag. Tōkyō 34: 35-54. 1920.—The following new species, varieties, and combinations are made: *Dryopteris dentipalea*, *Achyranthes japonica*, *A. molliscula*, *Aconitum mitakense*, *A. paniculigerum*, *A. volubile* vars. *napellifolium* (Seringe) Nakai and *flexuosum* (Reichenbach) Nakai, *Rosa hirtula* (Regel) Nakai, *Tilia Myabei* var. *yessoana*, *Stachys baicalensis* vars. *hispida* (Ledebour) Nakai and *hispidula* (Regel) Nakai, *S. palustris* var. *Imaii*, *Teucrium brevispicum*, *Pedicularis lunaris*, *Lobelia sessilifolia* var. *latifolia*, *Achillea rhodioparmica*, *Artemisia stolonifera* var. *laciniata*, and *Cirsium setidens* (Dunn) Nakai.—*Roxana Stinchfield Ferris*.

691. NELSON, J. C. Under which code. Amer. Bot. 26: 129-135. 1920.—A criticism of the American Code with arguments for the universal acceptance of the Vienna Code.—*S. P. Nichols*.

692. TURRILL, W. B. Botanical exploration in Chile and Argentina. Bull. Misc. Inf. Kew 1920: 57-66. 1920.—An extensive list of collectors and districts visited by them.—*E. B. Payson*.

693. WILLEY, FLORENCE. The vegetative organs of some perennial grasses. Proc. Iowa Acad. Sci. 25: 341-367. Fig. 121-144. 1920.—Recognition characters of the rhizomes and young shoots of 26 species of perennial grasses and one undetermined *Carex*. Only external features are given, except in *Poa*.—*H. S. Conard*.

694. ZIMMERMANN, WALTHER. *Badische Volksnamen von Pflanzen III*. [Baden common plant-names.] Mitteil. Badisch. Landesver. Naturk. u. Naturschutz in Freiburg N.S., 1: 49-57, 65-77. 1919.—An extensive list of common names of various plants, chiefly vascular, with the localities in which they are used.—*E. B. Payson*.

PTERIDOPHYTES

695. FONT QUER, P. Pteridofitas de las Pitiusas. [Pteridophytes of the Pityuses.] Bol. R. Soc. Española Hist. Nat. 19: 507-511. 1919.—The Department of Botany of the Museum of Natural Sciences of Barcelona has undertaken the study of the flora of the Pityuse Isles, in the Mediterranean about sixty miles east of the mainland of Spain. Several collecting trips extending over parts of two years brought to light a number of pteridophytes not reported before from these islands. Thirteen species are enumerated by the author as having been collected during the trips from the Barcelona Museum, localities and other information being given for the various entries. Mention is made of other botanists who have collected in these islands and considerable discussion is devoted to some of the species found or reported by them. Altogether the pteridophytes now known to occur in the Pityuse Isles number twenty-nine.—*O. E. Jennings*.

696. G[ONZÁLEZ] FRAGOSO, R[OMUALDO]. [Rev. of: CADEVALL Y DIARS, D. J. *Monografía de las Criptogamas vasculares catalanas*. (Monograph of Catalonian vascular cryptogams.) Mem. R. Acad. Cien. y Artes [Barcelona] 15, No. 7. July, 1919.] Bol. R. Soc. Española Hist. Nat. 19: 485-486. 1919.

697. HIERONYMUS, G. *Kleine Mitteilungen über Pteridophyten I.* [Short communications on Pteridophytes I.] *Hedwigia* 59: 319-339. 1918.—Critical notes are given concerning a number of species of *Athyrium* and *Diplazium*. The following new names and combinations occur: *Athyrium mengtzeense*, *A. cognatum* (*Asplenium cognatum* Mett.), *Diplazium vera-pax* (*Asplenium vera-pax* Donn.-Sm.), *D. novoguineense* (*D. silvaticum* (Bory) Sw. var. *novoguineense* Rosenst.), *D. Guildingii* (*Asplenium Guildingii* Jenman), *D. unilobum* (*Asplenium unilobum* Poir.), *D. Kaulfussii*, *D. alienum* (*Asplenium alienum* Mett.), *D. Mearnsii*.—E. B. Payson.

698. HIERONYMUS, G. *Kleine Mitteilungen über Pteridophyten II.* [Short communications on Pteridophytes II.] *Hedwigia* 61: 1-39. 1920.—Extensive notes are given concerning the synonymy, identity, and important characteristics of a number of species of the genus *Asplenium*. The following new names and new combinations are made: *Asplenium squamuligerum* (*A. varians* J. Sm. var. *squamuligera* Rosenst.), *A. fluminense* (*A. lunulatum* var. *fluminense* Lindm.), *A. otites* Link var. *lineari-lanceolata*, *A. acrocarpum* (*Diplazium acrocarpum* Rosenst.).—E. B. Payson.

699. MERRILL, E. D. On the identity of *Polypodium spinulosum* Burm. f. *Proc. Linn. Soc. New South Wales* 44: 353-354. 1919.—The excellent figure used by BURMAN, "Flora Indica," 1768, as illustrating *Polypodium spinulosum* Burm. f. is questioned. Burman's description is cited as short and imperfect. The writer considers that the plant was not from Java, as stated, but unquestionably is the West Australian species, *Synaphea polymorpha* R. Br., one of the Proteaceae. The adjustment of the synonymy to the name *Synaphea spinulosa* (Burm. f.) is given. It is stated that the species is of wide distribution in West Australia and agrees in all respects with Burman's description and figure.—Eloise Gerry.

700. WATTS, W. W. *Aspidium gongilodus* Schkuhr. *Jour. Botany* 58: 153. 1920.—The author takes exception to the practise of spelling the above specific name, when transferred to *Nephrodium*, as *gongylodes*, and points out that the original spelling probably had a different etymology.—K. M. Wiegand.

SPERMATOPHYTES

701. AMES, O. *Orchidaceae. Illustrations and studies of the family Orchidaceae* 6: xiv + 335 p., pl. 80-101. 1920.—This contribution to our knowledge of Malayan and Philippine Orchidaceae consists of two separate papers. The first by OAKES AMES and CHARLES SCHWEINFURTH is entitled "The orchids of Mount Kinabalu, British North Borneo" and the second, by OAKES AMES is entitled "Notes on Philippine Orchids, VII." The paper on Mount Kinabalu orchids is based largely on the collections made by CHAPLAIN JOSEPH CLEMENS in 1915, 222 species being enumerated. Of these, 1 genus and the following species are described as new: *Habenaria crassinervia*, *Chlorosa Clemensii*, *Goodyera rostellata*, *Kuhlhaseltia kinabaluensis*, *Vrydagzynea grandis*, *Nephelaphyllum flabellatum*, *Coelogyne amplissima*, *C. Clemensii*, *C. Clemensii* var. *longiscapa*, *C. compressicaulis*, *C. genuflexa*, *C. kinabaluensis*, *C. longibulbosa*, *C. plicatissima*, *C. radioferens*, *C. rigidiformis*, *Dendrochilum alatum*, *D. angustipetalum*, *D. crassifolium*, *D. exasperatum*, *D. fimbriatum*, *D. Haslamii*, *D. imbricatum*, *D. Jodemensii*, *D. kamborangense*, *D. lancilabium*, *D. lobongense*, *D. longirachis*, *D. perspicabile*, *D. quinquelobum*, *D. subintegrum*, *Pholidota Clemensii*, *P. kinabaluensis*, *P. pectinata*, *Nabalua* new genus, *N. Clemensii*, *Malaxis graciliscapa*, *M. multiflora*, *M. variabilis*, *Oberonia affinis*, *O. kinabaluensis*, *O. patentifolia*, *O. triangularis*, *Liparis grandis*, *L. kamborangensis*, *L. lingulata*, *L. pandurata*, *Arundina gracilis*, *Dendrobium bicarinatum*, *D. crumenatum* Sw. var. *parviflorum*, *D. fusco-pilosum*, *D. kiauense*, *D. longirepens*, *D. minimum*, *D. oblongum*, *D. patentilobum*, *D. singulare*, *D. tricallosum*, *D. tridentatum*, *Eria brevipedunculata*, *E. carnosissima*, *E. farinosa*, *E. latiuscula*, *E. macrophylla*, *E. magnicallosa*, *E. mollicaulis*, *Ceratostylis crassilingua*, *C. longisegmenta*, *Agrostophyllum globigerum*, *Chilopogon kinabaluensis*, *Appendicula divaricata*, *A. foliosa*, *A. linearifolia*, *A. longirostrata*, *A. magnibracteata*, *A.*

minutiflora, *Bromheadia divaricata*, *Phajus subtrilobus*, *Calanthe cuneata*, *C. tenuis*, *Bulbophyllum anguliferum*, *B. caudatisepalum*, *B. concavum*, *B. crassicaudatum*, *B. cuneifolium*, *B. deltoideum*, *B. disjunctum*, *B. eximium*, *B. lanceolatum*, *B. latiseptum*, *B. longimucronatum*, *B. magnivaginatatum*, *B. minutiflorum*, *B. pergracile*, *B. reflexum*, *B. rhizomatosum*, *B. sigmoideum*, *B. venustum*, *B. vinaceum*, *B. vinculibulbum*, *Thelasis carnosus*, *T. variabilis*, *Eulophia ovalifolia*, *Grammatophyllum kinabaluense*, *Cymbidium angustifolium*, *Thrixspermum crescentiforme*, *T. triangulare*, *Trichoglottis magnicallosa*, *T. tenuis*, *Malleola kinabaluensis*, *M. transversisaccata*, *Sarcanthus Merrillianus*, and *Microsaccus longicalcaratus*. New combinations are as follows: *Habenaria Gibbsiae* (Rolfe), *H. kinabaluensis* (Kränzl.), *H. Stapfii* (Kränzl.), *Malaxis kinabaluensis* (Rolfe), *M. amplexans* (J. J. Sm.), *M. bidentifera* (J. J. Sm.), *M. cordifolia* (Rolfe), *M. incurva* (J. J. Sm.), *M. moluccana* (J. J. Sm.), *M. moluccana* var. *sagittata* (J. J. Sm.), *M. nigrescens* (J. J. Sm.), *M. obovata* (J. J. Sm.), and *M. xanthochila* (J. J. Sm.). In the paper on Philippine orchids one new genus, *Philippinaea* Ames & Schltr., is described, based on *Adenostylis Wenzelii*, with the following new combination: *Philippinaea Wenzelii* (Ames) Ames & Schltr. The following species are described as new: *Coelogyne quinquelamellata*, *Dendrochilum binuangense*, *D. ecallosum*, *D. niveum*, *D. propinquum*, *D. purpureum*, *Malaxis cuneipetala*, *M. propinqua*, *M. Taylorii*, *Oberonia leytenensis*, *O. surigaensis*, *Liparis jarensis*, *L. monophylla*, *L. rizalensis*, *Dendrobium busuangense*, *Agrostophyllum leytenense*, *Spathoglottis Vanoverberghii*, *Bulbophyllum costatum*, *B. hortensoides*, *B. jarensis*, *B. masaganapense*, *B. philippinense*, *B. semiternum*, *Acriopsis floribunda*, *Saccolabium tenellum*, and *Taeniophyllum leytenense*.—E. D. Merrill.

702. ANONYMOUS. [Rev. of: FAWCETT, WILLIAM, AND ALFRED BARTON RENDLE. *Flora of Jamaica*, containing descriptions of the flowering plants known from the island. Vol. 4. Leguminosae to Callitrichaceae. xv + 369 p., 114 fig. Trustees of British Museum: London, 1920.] Jour. Botany 58: 275-277. 1920.—See Bot. Absts. 7, Entry 1435; 8, Entry 703.

703. ANONYMOUS. [Rev. of: FAWCETT, W., AND A. B. RENDLE. *Flora of Jamaica*, containing descriptions of the flowering plants known from the island, Vol. 4. Leguminosae to Callitrichaceae. xv + 369 p., 114 fig. Trustees of British Museum: London, 1920.] Nature 105: 738. 1920.—See Bot. Absts. 7, Entry 1435; 8, Entry 702.

704. ANONYMOUS. [Rev. of: SMALL, JAMES. *The origin and development of the Compositae*. New Phytologist. Reprint No. 11. xi + 334 p. Wm. Wesley & Son: London, 1919.] Jour. Botany 58: 202-204. 1920.—See Bot. Absts. 7, Entry 333; 8, Entry 705.

705. ANONYMOUS. *Ancestral studies of Compositae*. [Rev. of: SMALL, J[AMES]. *The origin and development of the Compositae*. New Phytologist. Reprint No. 11. xi + 334 p., 6 pl. Wm. Wesley & Son: London, 1919.] Nature 105: 450. 1920.—See Bot. Absts. 7, Entry 333; 8, Entry 704.

706. BALFOUR, I. BAILEY. *Some large leaved Rhododendrons*. Rhododendron Soc. Notes 1: 204-222. 1920.—An account of 14 species of the *Falconeri* series of the *Sciadendron* group with a key to the species. Four of the species are new, their technical description will appear in Notes Bot. Gard. Edinburgh.—Alfred Rehder.

707. BEAN, W. J. *The Fortunei group of Rhododendrons*. Rhododendron Soc. Notes 1: 187-194. 1919.—Notes on the taxonomy, history, and ornamental value of the 8 species constituting the *Fortunei* group are given and a key to the species appended.—Alfred Rehder.

708. VELLI, SAVERIO. *Lecture. L' "Althea taurinensis" DC. ed i suoi rapporti colle specie affini crescenti in Italia*. [Lecture. *Althaea taurinensis* DC., its descriptions, together with those of related species growing in Italy.] Atti R. Accad. Sci. Torino 54: 291-314 (173-196). 6 fig. 1919.—A contribution toward clearing up the identity of closely related species of *Althaea* from Italy. Detailed descriptions, citation of synonyms and exsiccatae, critical notes and remarks on the geographical distribution are given. The following new varieties are described: *Althaea taurinensis* DC. var. *Cesatiana*, *A. taurinensis* DC. var. *Regoana*, and *A. taurinensis* DC. var. *dissecta*.—Harriet M. Libby.

709. BITTER, GEORG. *Discopodium penninervium* Hochst. var. *Holstii* (Damm.) Bitt., eine verkannte Pflanze aus Deutsch-Ostafrika. [*Discopodium penninervium* Hochst. var. *Holstii* (Damm.) Bitt., a misunderstood plant from German East Africa.] Bot. Jahrb. 57: 15-17. 1920.—The author discovered two herbarium specimens of a large solanaceous plant, bearing the unpublished name *Solanum Albersi* U. Dammer, which proved to be very hairy examples of another solanaceous species, *Discopodium penninervium*. A study of *Withania Holstii* Dammer showed that it too was identical with these two specimens. In the present paper this hairy form and three others are proposed as new varieties, namely: *Discopodium penninervium* var. *Holstii* (Damm.), var. *nervisequum*, var. *intermedium*, and var. *sparsaeareaneosum*, all from Africa.—K. M. Wiegand.

710. BLAKE, S. F. Nine new plants of the genus *Stylosanthes*. Proc. Biol. Soc. Washington [D. C.] 33: 45-54. 1920.—Nine new species of the genus *Stylosanthes* are described from material in the United States National Herbarium, as follows: *S. gloiodes* from Ecuador, *S. pliscata* from Brazil, *S. macrocarpa*, *S. diarthra*, *S. purpurata*, and *S. subsericea* from Mexico, *S. tuberculata* from Bahama Islands and Cuba, *S. floridana* from Florida, and *S. macrosoma* from Paraguay.—J. C. Gilman.

711. BOULENGER, G. A. On *Rosa britannica* Déséglise. Jour. Botany 58: 185-187. 1920.—This rose, having a wide distribution in England, has appeared under various names, as *R. tomentosa* Smith, *R. foetida* Bast., *R. scabriuscula* Smith, *R. Jundzilliana* Baker, and *R. silvestris* Woods. It has also been confused by Woods with *R. micrantha*. An extended description and discussion are given. The odor of the foliage in roses is not always connected with glands as usually stated in books. Completely smooth leaves of *R. dumetorum* had the apple scent of sweet brier, while very glandular specimens of *R. micrantha* were sometimes devoid of odor.—K. M. Wiegand.

712. BRITTEN, JAMES. *Eugenia lucida*. Jour. Botany 58: 151-152. 1920.—In making a list of LOUREIRO's plants in the National Herbarium the author has noted that an error was made by SEEMANN, who considered *Opa odorata* Lour. and *Syzygium lucidum* Gaertn. synonymous. A sheet in the Banksian Herbarium collected by BANKS on the Endeavour's River, New South Wales, on which GAERTNER based his name, was discovered by Britten, and is not *Opa odorata*.—K. M. Wiegand.

713. BRITTEN, JAMES. *Impatiens glandulifera* Royle (I. Roylei Walp.) forma alba. Jour. Botany 58: 201. 1920.—This form is described as new. It has been distributed by the author to various gardens in England and Ireland, and was also seen by him in the garden of Miss JEKYLL at Munstead.—K. M. Wiegand.

714. BROWN, N. E. New and old species of *Mesembryanthemum*, with critical notes. Jour. Linn. Soc. London Bot. 45: 53-140. Pl. 5-10. 1920.—A critical treatment of many old species of *Mesembryanthemum* and a description of over fifty new species.—A. J. Eames.

715. BROWN, N. E. A new species of *Lobostemon* in the Linnean Herbarium. Jour. Linn. Soc. London Bot. 45: 141-142. 1920.—*Lobostemon magnisepalum* is described as new to science. It is a native of South Africa.—E. B. Payson.

716. CANDOLLE, C. DE. Piperaceae africanae. [Piperaceae of Africa.] Bot. Jahrb. 57: 18-19. 1920.—Three species of *Piper* are discussed and two of *Peperomia*. Of these *Piper Zenkeri* (Kamerun), *Peperomia kyimbilana* (North Nyassaland), and *P. Stolzii* (N. Nyassaland) are described as new.—K. M. Wiegand.

717. CLUTE, WILLARD N. The toad lily. *Tricyrtis hirta*. Amer. Bot. 26: 138-140. 1920.—A description of the flower.—S. P. Nichols.

718. COKER, W. C. *Azalea atlantica* Ashe and its variety luteo-alba n. var. Jour. Elisha Mitchell Sci. Soc. 36: 97-99. Pl. 1 (in color), 7. 1920.—This little-known species, abundant on the coastal plain of the Carolinas, is described, and a new variety, namely, *luteo-alba* is proposed.—W. C. Coker.

719. DENSLOW, H. M. Further reflections of an orchid-hunter. Jour. New York Bot. Gard. 21: 145-156. 1920.—The orchid flora even of the eastern states is not yet well known and much more information is needed on the life histories of various species. Herbaria do not contain sufficient specimens to indicate geographical distribution accurately. Field work on orchids must be prosecuted promptly and actively, since the orchid flora is rapidly disappearing.—H. A. Gleason.

720. ENGLER, ADOLPH, UND ERNST GILG. Syllabus der Pflanzenfamilien. [Syllabus of the families of plants.] 8vo, 8th ed., 395 p., 457 fig. Gebrüder Borntraeger: Berlin, 1919.—A comprehensive and epitomized survey of the families of plants from and including the Schizomycetes (Bacteria) to the Compositae of the Dicotyledons. There is included also a brief classification of vegetation from a geographical standpoint. Very few and but minor changes are made from the arrangement given in the seventh edition of this work.—E. B. Payson.

721. FERNALD, M. L. *Gaultheria procumbens* L., forma *suborbiculata*, n. f. *Rhodora* 22: 155-156. 1920.—An extreme form with strikingly large round leaves, collected in Harwichport, Harwich, Massachusetts.—James P. Poole.

722. FERNALD, M. L. *Lactuca hirsuta* Muhl., forma *calvifolia*, n. f. *Rhodora* 22: 156. 1920.—This new form differs from the typical *L. hirsuta* in the leaves being glabrous beneath and in some specimens extremely thin and membranous.—James P. Poole.

723. HAMET, RAYMOND. Sur un nouveau *Sedum* chinois de l'herbier du Museum d'Histoire Naturelle de Paris. [A new *Sedum* from China.] Bull. Soc. Bot. Genève 11: 146-150. 1919.—The new species, *Sedum Pinoyi* Hamet, is compared with other species of *Sedum* which are closely related to it.—W. H. Emig.

724. HITCHCOCK, A. S. Revisions of North American grasses: *Isachne*, *Oplismenus*, *Echinochloa*, and *Chaetochloa*. Contrib. U. S. Nation. Herb. 22: 115-208. Pl. 25-32, fig. 21-62. 1920.—Four papers are presented under this title. In the first, eight species of *Isachne* are described, each illustrated by a plate. In the second, four species of *Oplismenus* are described and figured. In the third paper, seven species of *Echinochloa*, one form of which has been cultivated in the United States under the names "billion dollar grass" and "Japanese barnyard millet," are described and figured. Several varieties of *E. crusgalli* are recognized and illustrated, and the following new names occur: *Echinochloa polytachya* (HBK.) Hitchc., *E. oplismenoides* (Fourn.) Hitchc., and *E. crusgalli crus-pavonis* (HBK.) Hitchc. In the fourth paper, twenty-six species of *Chaetochloa*, more widely known as *Setaria*, are described, and all, with the exception of *C. ambigua*, are represented by figures. The following new names occur: *Chaetochloa Poiretiana* (Schult.) Hitchc., *C. palmifolia* (Willd.) Hitchc. & Chase, *C. tenax* (L. Rich.) Hitchc., and *C. Scheelei* (Steud.) Hitchc. The treatment in each paper consists of a short introduction, a description of the genus with its synonyms, and a key to the species. Under each species the synonymy is given, in some cases very extensive, followed by the description and the citation of specimens.—S. F. Blake.

725. LADBROOK, JAMES. A new species of *Coupoui*. Jour. Botany 58: 176-177. 1920.—This new species, *C. micrantha*, was found in the British Museum herbarium among unnamed specimens of *Tabernaemontana*, and was collected by MARTIN in Guiana. This species adds a fourth to the three included in WERNHAM's account of *Coupoui* in Jour. Botany 58: 105-108. 1920.—K. M. Wiegand.

726. LINDAU, G. Acanthaceae africanae. X. [Acanthaceae of Africa. X.] Bot. Jahrb. 57: 20-24. 1920.—Eight species, in seven genera, are discussed, all new to science: *Hygrophila kymbilensis* (N. Nyassaland), *Mellera menthiodora* (interior Africa), *Pseudobarleria glandulifera* (Southwest Africa), *Dyschoriste albiflora* (N. Nyassaland), *Barleria* (Eubarleria) *albida* (N. Hereroland), *Asystasia leptostachya* (Kamerun), *A. glandulifera* (Kamerun), and *Anisotes ukambanensis* (Massai Steppes).—K. M. Wiegand.

727. LINDMAN, C. A. M. *Svensk Fanerogamflora*. [Swedish phanerogamic flora.] 8vo, viii + 639 p., many fig. P. A. Norstedt & Söners: Stockholm, Sweden. 1918.—This is a comprehensive manual of the flowering plants of Sweden. The author gives a detailed key to families and distinctive genera based upon the sexual system of Linnaeus. Keys are also given, under the family description, to genera and species. The ENGLER and PRANTL sequence is followed in the arrangement of families. All species are at least briefly described and notes on distribution are included. The book is copiously illustrated with text figures. The following new species and subspecies are described: *Poa alpigena* (*Poa pratensis* L. var. *alpigena* Fries), *Puccinellia Borreri* (*Festuca Borreri* Bab.), *Festuca ovina* L. subsp. *duriuscula* (F. *duriuscula* L.), *Zerna inermis* (*Bromus inermis* Leyss.), *Z. ramosa* (*Bromus ramosus* Huds.), *Z. Benekeni* (*Bromus Benekeni* Syme), *Z. unioloidea* (*Bromus unioloidea* HBK.), *Agropyrum violaceum* (*Triticum violaceum* Horn?), *Scirpus atrichus* (*Trichophorum atrichum* Palla), *S. alpinus* (*Eriophorum alpinum* L.), *Betula coriacea* Gunnarss., *B. coriacea* var. *tremuloides* Gunnarss., *B. concinna* Gunnarss., *B. pubescens* Ehrb. subsp. *suecica* Gunnarss., *Atriplex praecox* Hülphers, *Arabis suecica* (A. *italiana* L. var. *suecica* Fr.), *Crataegus Palmstruchii*, *C. curvisepala*, *Trimorpha elongata* (*Erigeron elongatus* Ledeb.), *T. canadensis* (*Erigeron canadensis* L.). [See also Bot. Absts. 8, 686.]—E. B. Payson.

728. MATTHEWS, J. R. Cheshire roses. Jour. Botany 58: 137-141. 1920.—Notes on distribution and distinguishing characteristics are given on twenty-eight species and several varieties of roses occurring in Cheshire. The notes are partly from the author's material, and partly compiled from those of COLONEL WOLLEY-DOD.—K. M. Wiegand.

729. MERRILL, E. D. New or noteworthy Philippine plants, XV. Philippine Jour. Sci. 14: 365-457. 1919.—Besides 18 species previously unknown from the Philippines, the following are described as new to science: *Pandanus partayensis*, *P. camarinensis*, *Andropogon philippinensis*, *A. gryllus* L. var. *philippensis*, *Mariscus niveus* (*Schoenus niveus* Murr.), *Cryptocoryne aponogetifolia*, *C. pygmaea*, *Elatostema panayense*, *E. Macgregorii*, *E. zamboangense*, *E. acumatissimum*, *E. Robinsonii*, *E. pilosum*, *E. suborbiculare*, *E. diversilimbum*, *E. appendiculatum*, *Elatostematoides samarense*, *Aristolochia membranacea*, *Haematocarpus subpeltatus*, *Artabotrys monogynus*, *A. cagayensis*, *Goniotalamus lancifolius*, *G. longistylus*, *Mitrephora cagayanensis*, *Oxymitra multinervia*, *O. platyphylla*, *Papualthia heteropetala*, *Phaeanthus pubescens*, *P. villosus*, *Polyalthia dolichophylla*, *Pseuduvaria grandiflora*, *Uvaria panayensis*, *U. Macgregorii*, *Cryptocarya Ramosii*, *C. euphlebia*, *C. elliptifolia*, *Neolitsia lanceolata*, *N. paucinervia*, *Polyosma villosa*, *P. longipetiolata*, *Pittosporum pseudostipitatum*, *P. acuminatissimum*, *P. glaberrimum*, *Connarus castaneus*, *Rourea luzoniensis*, *Ormosia orbiculata*, *O. Clementis*, *O. basilanensis*, *O. grandifolia*, *Evodia sessilifoliola*, *Aglaia diffusiflora*, *Semecarpus subsessilifolia*, *S. ferruginea*, *Oncocarpus obovatus* (*Dichapetalum obovatum* Elm.), *Parishia oblongifolia*, *Villaresia philippinensis*, *V. latifolia*, *Miquelia philippinensis*, *Allophylus stenophyllus*, *Guioa parvifoliola*, *Elaeocarpus ilocanus*, *Pterospermum megalanthum*, *Dillenia megalophylla*, *Saurauia Santosii*, *Homalium Ramosii*, *Begonia Collisiae*, *B. lancilimba*, *B. obtusifolia*, *B. rubrifolia*, *B. serpens*, *B. panayensis*, *B. platyphylla*, *Cloëzia urdanensis* (*Photinia urdanensis* Elm.), *Tristania oblongifolia*, *Medinilla oblanceolata*, *Memecylon Ramosii*, *M. stenophyllum*, *Otanthera strigosa*, *Astronia brachybotrys*, *Schefflera obtusifolia*, *S. Alvarezii*, *S. globosa*, *S. platyphylla*, *S. Santosii*, *S. panayensis*, *Boerlagiodendron caudatum*, *Vaccinium ilocanum*, *Diplycosia glabra*, *Ardisia ilocana*, *A. longipetiolata*, *Amblyanthopsis crassifolia*, *Palaguium glabrifolium*, *Symplocos brachybotrys*, *Geniostoma pachyphyllum*, *Alyxia retusa*, *Rauwolfia membranacea*, *Tabernaemontana ecarinata*, *Callicarpa obtusifolia*, *Cyrtandra ilocana*, *C. panayensis*, *C. Santosii*, *C. lancifolia*, *Hemigraphis nummularifolia*, *Vernonia glandulifolia*.—Albert R. Sweetser.

730. MERRILL, E. D. Notes on the flora of Sumatra. Philippine Jour. Sci. 14: 239-250. 1919.—It is estimated that since the publication of MIGUEL's "Flora Sumatra" not over 500 species have been added, bringing the number of species of Spermatophytes to approximately 3000. From a collection by BARTLETT and LA RUE, aggregating about 500 numbers, several

species not previously credited to Sumatra are enumerated and a few new species are described. The following is a list of species new to science and new combinations included in the paper: *Oreocnide nivea*, *Litsea umbellata* (*Hexanthus umbellatus* Lour.), *Leea indica* (*Staphylea indica* Burm. f.), *Osmelia Barlettii*, *Memecylon Laruei*, *Callicarpa brevipedunculata*, *Blumea pubigera* (*Conyza pubigera* L.).—Albert R. Sweetser.

731. MOORE, SPENCER LE M. *Alabastra diversa*.—Part XXXIII. Jour. Botany 58: 187-195, 219-226, 267-271. 1920.—1. Plantarum Mascarensium pugillus. The genera *Homaliopsis* (Flacourtiaceae) and *Vaughania* (Leguminosae, tribe Galegae) are described as new, and the following new species are proposed: *Homaliopsis Forbesii*, Madagascar; *Vaughania dionaeaeifolia*, Madagascar; *Noronhea comorensis*, Comoro Islands; *Lasiosiphon hibbertioides*, Madagascar. 2. Acanthaceae Papuanae. The genus *Hulemacanthus* (tribe Justiceae) is described as new, several known species are listed, and the following new species and varieties are proposed: *Hemigraphis suborbicularis*, Bismarck Archipelago; *H. Whitei*, Yule Island; *H. ciliata*, Mekeo District; *Pseuderanthemum confertum*, Yule Island; *P. Bradtkei*, Bismarck Archipelago; *P. Armitii*, Papua; *Justicia Chalmersii* Lind., var. *latifolia*, Sapphire Creek; *Justicia platyphylla*, Astrolabe Range; *Hulemacanthus Whitei*, Deva Deva. 3. Miscellanea Africana. The following genera, species, and varieties are described as new: *Nectaropetalum congolense*, Mayumbe; *Umbellulanthus* gen. nov. (Erythroxylaceae), *U. floribundus*, Mayumbe; *Monocephalum* gen. nov. (Icacinaceae), *M. Batesii*, Cameroons; *M. Zenkeri*, Cameroons; *Stachyanthus nigeriensis*, S. Nigeria; *S. obovatus*, Mayumbe; *Pyrenacantha sylvestris*, Mayumbe; *Rhaphiostyles ferruginea* Engl., var. *parvifolia*; *Strombosia retevenia*, S. Nigeria; *S. majuscula*, Portuguese Congo; *S. toroensis*, Toro; *S. Grossweileri*, Mayumbe; *Strombosiopsis buxifolia*, Mayumbe; *Coula utilis*, Mayumbe; *Batesanthus intrusus*, Yaunde; *Anisopus Batesii*, Yaunde; *Aristolochia ceropegiooides*, Yaunde; *A. Ju-ju*, South Nigeria; *Drypetes peltophora*, Yaunde; *D. Taylorii*, E. Africa; *D. Grossweileri*, Portuguese Congo.—K. M. Wiegand.

732. PENNELL, FRANCIS W. *Scrophulariaceae of the southeastern United States*. Proc. Philadelphia Acad. Sci. 71: 224-291. 1919.—Extensive keys intended to "include all features of evident contrast" are given for the 38 genera and 123 species known to occur in the area from North Carolina to Florida and west to the Mississippi river. The work is based largely upon notes from fresh flowers. Habitat, distribution, date of flowering, color of corolla, and references to herbarium material are given for each species.—Leva B. Walker.

733. PUGSLEY, H. W. *Plantago alpina* and *P. maritima*. Jour. Botany 58: 149-150. 1920.—It is often with difficulty that dwarf plants of *P. maritima* are distinguished from plants of *P. alpina*. In the spring, however, when growth is beginning the two species can be more clearly differentiated. The author discusses these structural and habitat differences as based on plants growing in his garden, where *P. alpina* flowers earlier and more sparingly than *P. maritima*.—K. M. Wiegand.

734. REHDER, ALFRED. *New species, varieties and combinations from the herbarium and the collections of the Arnold Arboretum*. Jour. Arnold Arboretum 2: 121-128. 1920.—The present article contains two new species of *Lonicera*, *L. subsessilis* from Korea and *L. demissa* from Japan, and the following hybrids, species and varieties based on cultivated plants: \times *Prunus Arnoldiana*, \times *P. Meyeri*, *P. Padus* var. *laxa*, *Acanthopanax ternatus*, \times *Viburnum Jackii*, and *Physocarpus intermedius* f. *parvifolius*.—Alfred Rehder.

735. RIDLEY, HENRY N. *Plantago Cynops* L. in Kent. Jour. Botany 58: 271-272. 1920.—The above species, a native of the chalk barrens of southern Europe, was found by CHARLES BAKER on similar chalk downs between Cobham and Meopham in Kent. It is apparently entirely absent from northern France. The Kent downs are peculiar in harboring other plants that are rare in England.—K. M. Wiegand.

736. ROBINSON, B. L. Further diagnoses and notes on tropical American Eupatorieae. Contrib. Gray Herb. N. S., 61: 3-30. 1920.—The following new genus, new species and varieties, new names and combinations occur: *Ageratum rivale*, *Alomia chiriquensis*, *Eupatorium aequinoctiale*, *E. Blakei*, *E. eucosum*, *E. gymnoxymorphum* Rusby (*E. gymnoxoides* Rusby), *E. huigrense*, *E. Kalenbornianum*, *E. longipetiolatum* Sch. Bip. var. *typicum*, *E. longipetiolatum* Sch. Bip. var. *arbusculare*, *E. pichinchense* HBK. forma *typicum*, *E. pichinchense* HBK. forma *glandulare*, *E. polopolense*, *E. prionophyllum* Robinson var. *typicum*, *E. prionophyllum* Robinson var. *asymmetrum*, *E. trinittense* Rusby & Robinson (*Baccharis trinittensis* Ktze.), *Mikania amblyolepis*, *M. Andrei*, *M. bullata*, *M. clematidiflora* Rusby, *M. filicifolia*, *M. flabellata* Rusby, *M. globifera* Rusby, *M. gracilipes*, *M. Hioramii* Britton & Robinson, *M. Jamesonii*, *M. lancifolia*, *M. ligustrifolia* DC. var. *subsessilis*, *M. Mathewsii*, *M. miconioides*, *M. Pennellii*, *M. rugosa*, *M. Seemannii*, *M. tarapotensis*, *M. trachodes*, *M. vitrea*, *Sphaereupatorium* Ktze., *S. Hoffmannii* Ktze., *Ophryosporus eleutherantherus* (*Eupatorium eleutherantherum* Rusby), *Eupatorium nicaraguense*.—E. B. Payson.

737. ROBINSON, B. L. The Eupatoriums of Bolivia. Contrib. Gray Herb. N. S., 61: 30-80. 1920.—The author gives a brief historical account of the progress of taxonomy in Bolivia with particular reference to species of *Eupatorium*, of which 68 species are now known to occur in Bolivia. Of these, 29 are known only from Bolivia. There is reason to suppose that of the Eupatoriums indigenous to Bolivia a great part are still to be discovered. In the present paper the species are grouped under the sections to which they are referred and subsectional keys given to the species. Species previously undescribed in the present series of papers are accompanied by a complete diagnosis. Specimens are cited for all species. The following new varieties and forms and new combinations are included: *Eupatorium tunariense* (*E. conyzoides* [Vahl] Ktze. var. *tunariense* Hieron.), *E. patens* D. Don var. *typicum*, *E. pyramidale* Klatt var. *angustifolium* (*E. amygdalinum* Lam. var. *revolutum* [Pohl] Bak. forma *angustifolium* Hieron.), *E. rufescens* Lund. var. *typicum*.—E. B. Payson.

738. RYDBERG, PER AXEL. Rosales. Fabaceae: Psoraleae. North Amer. Flora [New York] 24: 65-136. 1920.—The author completes the treatment of the genus *Parosela* and elaborates the genera *Thornera*, *Petalostemon*, and *Kuhnistera*. The following new species are described and new combinations made: *Parosela lagopina*, *P. exserta*, *P. Barberi* Rose, *P. lucida* Rose, *P. fissa*, *P. Bigelovii*, *P. pilifera*, *P. Townsendii*, *P. ervoides* (*Dalea ervoides* Benth.), *P. costaricana*, *P. leporina* (*Psoralea leporina* Ait.), *P. alopecuroides* (*Dalea alopecuroides* Willd.), *P. Thouinii* (*Dalea Thouinii* Schrank), *P. flava* (*Dalea flava* Mart. & Gal.), *P. elata* (*Dalea elata* H. & A.), *P. roseola*, *P. citrina*, *P. caudata*, *P. attenuata*, *P. bicolor* (*Dalea bicolor* Willd.), *P. quinqueflora* (*Dalea quinqueflora* Brand.), *P. Lloydii*, *P. laxa*, *P. minutifolia*, *P. Conzattii*, *P. tuberculina*, *P. fulvosericca*, *P. polycephala* (*Dalea polycephala* Benth.), *P. decora* (*Dalea decora* S. Shauer), *P. dorycnoides* (*Dalea dorycnoides* DC.), *P. pilosissima*, *P. abietifolia* Rose, *P. subvillosa*, *P. scariosa* (*Dalea scariosa* S. Wats.), *P. trifoliolata* (*Dalea trifoliolata* Moric.), *P. reclinata* (*Psoralea reclinata* Cav.), *P. versicolor* (*Dalea versicolor* Zucc.), *P. tsugoides*, *P. megalostachys* Rose, *P. sanctae-crucis*, *P. leucantha*, *P. sessilis* (*Dalea Wislizeni* var. *sessilis* A. Gray), *P. leucosericea*, *P. longifolia* Rose, *P. roseiflora*, *P. Smithii*, *P. glabrescens*, *P. involuta*, *P. melaniha* (*Dalea melaniha* S. Schauer), *P. fuscescens*, *P. zimapanica* (*Dalea zimapanica* S. Schauer), *P. diversicolor*, *P. argyrostachya* (*Dalea argyrostachya* H. & A.), *P. Botterii*, *P. gigantea* Rose, *P. atrocyanea*, *P. Wardii*, *P. caudata*, *P. capitulata*, *P. tehucana*, *P. emphysodes* (*Psoralea emphysodes* Jacq.), *P. scandens* (*Psoralea scandens* Mill.), *P. floridana*, *P. humilis* (*Psoralea humilis* Mill.), *P. vulneraria* (*Dalea vulneraria* var. *typica* Oerst.), *P. occidentalis*, *P. platyphylla*, *P. barbata* (*Dalea vulneraria* var. *barbata* Oerst.), *Thornera lutea*, *T. Watsoni* (*Parosela Watsoni* Rose), *T. villosa*, *T. leucantha*, *T. Ordiae* (*Dalea Ordiae* A. Gray), *T. Grayi* (*Parosela Grayi* Vail), *T. revoluta* (*Dalea revoluta* S. Wats.), *T. Pringlei* (*Dalea Pringlei* A. Gray), *T. Nelsonii* (*Dalea Nelsonii* Rose), *T. pumila*, *T. Dalea* (*Psoralea Dalea* L.), *T. robusta*, *Petalostemon truncatus*, *P. sonorae*, *P. pilulosus*, *P. confusus*, *P. evanescens* Rose (*Dalea evanescens* Brand.), *P. obreniformis*, *P. Standleyanus*, *P. lagopus*, *P. Rothrockii*, *Kuhnistera adenopoda* (*Petalostemon corymbosum* var. *adenopodum* B. L. Robinson).—E. B. Payson.

739. SALMON, C. E. *Ranunculus Lingua*. Jour. Botany 58: 275. 1920.—The occurrence of *R. Lingua* var. *glabratus* Wallr. is recorded in Great Britain.—K. M. Wiegand.
740. SARGENT, C. S. Notes on North American trees VII. Jour. Arnold Arboretum 2: 112-121. 1920.—This article deals with *Prunus* and *Aesculus* and the following new combination and new varieties and one new hybrid are proposed: *Prunus americana* var. *floridana*, *P. mexicana* var. *reticulata* (Sarg.), *P. mexicana* var. *polyandra* (Sarg.), *P. mexicana* var. *fultonensis* (Sarg.), *P. virginiana* var. *demissa* f. *pachyrrhachis* (Koehne), *P. virginiana* var. *melanocarpa* (A. Nels.), *P. virens* var. *rufula* (Wooton & Standl.), *Aesculus octandra* var. *virginica*, *A. georgiana* var. *lanceolata*, \times *A. mississippiensis*. (See also Bot. Absts. 1, Entries 812, 1127, 1128; 3, Entry 1837; 4, Entry 1766; 7, Entry 2232.)—Alfred Rehder.
741. SCHNEIDER, CAMILLO. Notes on American willows X. Jour. Arnold Arboretum 2: 65-90. 1920.—The present article deals with the sections *Fulvae* and *Roseae* each containing 3 species, with 2 species of doubtful affinity and a species of the section *Glaucæ* omitted from the treatment of that section. As in the preceding articles the synonymy, nomenclature, distribution and relationship of the species and varieties are discussed at length and the following new combinations proposed: *Salix Bebbiana* var. *perrostrata* (Rydb.), *S. Geyeriana* var. *argentea* (Bebb), and *S. Scouleriana* var. *Austinae* (Bebb). (See also Bot. Absts. 1, Entries 801, 813; 3, Entries 1838, 1839; 4, Entries 1769, 1770; 7, Entries 1490, 2238, 2239.)—Alfred Rehder.
742. STANDLEY, PAUL C. A new species of *Camptosperma* from Panama. Jour. Arnold Arboretum 2: 111-112. 1920.—*Camptosperma panamensis* is described as a new species of a genus known before in America only from a single Brazilian species.—Alfred Rehder.
743. STANDLEY, PAUL C. Six new species of plants from Mexico. Proc. Biol. Soc. Washington [D. C.] 33: 65-68. 1920.—Four plants belonging to the family Polygonaceae one to the Aristolochiaceae and one to the Hydrangeaceae are described from Mexico as new species. They are: *Aristolochia malacophylla*, *Podopterus cordifolius*, *Ruprechtia occidentalis*, *Coccoloba acapulcensis*, *C. chiapensis*, and *Fendlerella lasiopetala*.—J. C. Gilman.
744. STANDLEY, PAUL C. Trees and shrubs of Mexico (Gleicheniaceae-Betulaceae). Contrib. U. S. Nation. Herb. 23: 1-169. 1920.—This paper forms the first part of a volume intended to provide a keyed synopsis of the woody plants of Mexico, and an account of their local names and uses. After a short introduction describing the general features of Mexican botany, the plan of the work is discussed, and a short history of the early botanical exploration of Mexico up to the time of HUMBOLDT is given. This is followed by a key to the families. Under the families keys are given to the genera and species, and under each species a brief description is generally given. The chief synonymy is included under each species, with an account of the range and the local names and uses. The ferns have been treated by W. R. MAXON, the grasses by A. S. HITCHCOCK, and the Amaryllidaceae by W. TRELEASE. The larger genera included in this part of the work are the following: *Agave*, with 170 species; *Piper*, with 59; *Pinus*, with 26; and *Chamaedorea*, with 25. The following new species and new names occur: *Inodes mexicana* (Mart.) Standl., *I. japa* (C. Wr.) Standl., *Yucca jaliscensis* Trel., *Agave panamana* Trel., *A. stringens* Trel., *A. subtilis* Trel., *A. pedrosana* Trel., *A. Gutierreziana* Trel., *A. palmaris* Trel., *A. rhodacantha* Trel., *A. pes-mulae* Trel., *A. pacifica* Trel., *A. pseudotequilana* Trel., *A. Sullivani* Trel., *A. yaquiana* Trel., *A. rasconensis* Trel., *A. guadalupana* Trel., *A. felina* Trel., *A. subzonata* Trel., *A. mapisaga* Trel., *A. Bourgaei* Trel., *A. mirabilis* Trel., *A. abrupta* Trel., *A. Wercklei* Weber, *A. flexispina* Trel., *A. Eduardi* Trel., *A. pedunculifera* Trel., *A. potrerana* Trel., *A. inopinabilis* Trel., *A. convallis* Trel., *A. dissimulans* Trel., *A. angustiarum* Trel., *A. victoriae-reginae* f. *Nickelsi* (Roland-Gosselin) Trel., *A. Mulfordiana* Trel., *A. Schottii* var. *atricha* Trel., *A. angustissima* var. *Ortigiesiana* (Baker) Trel.—S. F. Blake.
745. STEPHENSON, T., AND T. A. STEPHENSON. A new marsh Orchis. Jour. Botany 58: 165-170. 3 fig. 1920.—*Orchis purpurella* is described as new, consisting of two forms desig-

nated as A and B. Four points are given special attention: Form of the lip, its color, spots on the leaves, and dwarf habit. These are discussed in relation to various closely related species, as *O. salina* Turcz., *O. cruenta* Müll., *O. Fuchsii* Druce, *O. ericetorum* Linton, *O. praetermissa* var. *pulchella* Druce, *O. latifolia* L., and *O. incarnata*, with the conclusion that *O. purpurella* is a valid species, differing from the above species by the characters given. The form B is closely related to *O. cruenta* but can scarcely be referred to it, neither is it a dwarf form of *O. latifolia*. Hybrids of *O. purpurella* with a dwarf form of *O. latifolia* and with *O. ericetorum* are noted. The forms described may have arisen by crossings of *O. incarnata* or *O. praetermissa* with *O. latifolia* or *O. maculata*, but the theory is favored that they are mutations from *O. incarnata*.—K. M. Wiegand.

746. STEPHENSON, T., AND T. A. STEPHENSON. The genus *Epipactis* in Britain. Jour. Botany 58: 209-213. Pl. 555. 1920.—A critical study of *Epipactis* and *Orchis* extending over several years resulted in a paper too large to publish as a whole. The present article contains the important conclusions with respect to *Epipactis*. Five species are recognized for Britain: *E. palustris* Crantz, *E. atropurpurea* Raf., *E. viridiflora* Rehb., *E. purpurata* Sm., and *E. latifolia* Allm. The distinguishing features between the species are noted and discussed. *E. latifolia* should include *E. media* Fries and *E. atroviridis* Linton. The conclusion is reached that lip-bosses and details of leaf-scheme on which the last two species' names were founded are very unstable and of no value as specific characters. These two names should be dropped. It is not believed that *E. media* and *E. atroviridis* are hybrids, as they do not behave like other hybrids with which the authors are acquainted.—K. M. Wiegand.

747. STEPHENSON, T., AND T. A. STEPHENSON. The British palmate orchids. Jour. Botany 58: 257-262. 1 pl. 1920.—This is a summary of several years' work on the marsh and spotted orchids. Notwithstanding the great number of forms which more or less intergrade, certain "landmarks" or species and certain hybrids may be recognized. The British palmate orchids comprise the following species: *Orchis incarnata* L., *O. purpurella* Stephenson, *O. ericetorum* Linton, *O. praetermissa* Druce, *O. latifolia* L., and *O. Fuchsii* Druce. The characteristics of each of these is discussed, and reasons given for the belief that they are true species. The colored plate which serves to illustrate previous papers by these authors as well as papers to follow, is discussed in detail, and the differences between the species and peculiarities of the hybrids as they appear in the plate are pointed out.—K. M. Wiegand.

748. SVENSON, H. K. A northeastern variety of *Panicum*. Rhodora 22: 153-155. 5 fig. 1920.—The author describes *Panicum dichotomiflorum* Michx. var. *puritanorum*, n. var., from Massachusetts.—James P. Poole.

749. SWINGLE, WALTER T. A new species of *Pistacia* native to southwestern Texas, *P. texana*. Jour. Arnold Arboretum 2: 105-110. 1920.—The *Pistacia* of southwestern Texas and northern Mexico formerly included under *P. mexicana* HBK. is described as a new species, *P. texana*.—Alfred Rehder.

750. VICIOSO, CARLOS. Una especie nueva del genero *Gypsophila*. [A new species of the genus *Gypsophila*.] Bol. R. Soc. Española Hist. Nat. 19: 493-494. 1919.—*Gypsophila Ceballosi* Pau & C. Vic., collected in Escorial, central Spain.—O. E. Jennings.

751. VISCHER, W. Sur les *Quararibea* Aubl. un genre de Bombacées à ovaire infère. [Concerning the species of *Quararibea* Aubl. a genus of the family Bombacaceae with inferior ovaries.] Bull. Soc. Bot. Genève 11: 199-210. 5 fig. 1919.—The characteristics of the various types of flowers of the genus *Quararibea* are given. A number of new combinations are introduced and a new species, *Quararibea Chodati* Vischer, is described.—W. H. Emig.

MISCELLANEOUS, UNCLASSIFIED PUBLICATIONS

B. E. LIVINGSTON, *Editor*S. F. TRELEASE, *Assistant Editor*

752. ANONYMOUS. Turning a liability into an asset. *Sci. Amer. Monthly* 2: 129. 1920.—The commercial possibilities of the water hyacinth (*Eichornia crassipes*) are discussed.—*Chas. H. Otis*.

753. ANONYMOUS. [Rev. of: SPITTA, E. J. *Microscopy: the construction, theory, and use of the microscope*. 3d ed., xxviii + 537 p., 28 pl. John Murray: London, 1920.] *Nature* 106: 77-78. 1920.—In the present edition may be noted especially the reference to low power objectives designed to give great depth of focus and a flat field. The book is illustrated by a considerable number of new plates.—*O. A. Stevens*.

754. DURAND, R. *Bactéries et papier-monnaie*. [Bacteria and paper money.] *Bull. Sci. Pharm.* 27: 357-358. 1920.—A single bill of paper money may contain as many as 100,000 bacteria. These belong chiefly to the bacteria of the intestinal flora, but bacilli communicating contagious diseases were also found.—*H. Engelhardt*.

755. INGLE, HARRY. The oil industry. [Rev. of: MARTIN, GEOFFREY. *Animal and vegetable oils, fats, and waxes: their manufacture, refining, and analysis, including the manufacture of candles, margarine and butter*. A practical treatise. x + 213 p. Crosby Lockwood and Son: London, 1920.] *Nature* 106: 43-44. 1920.

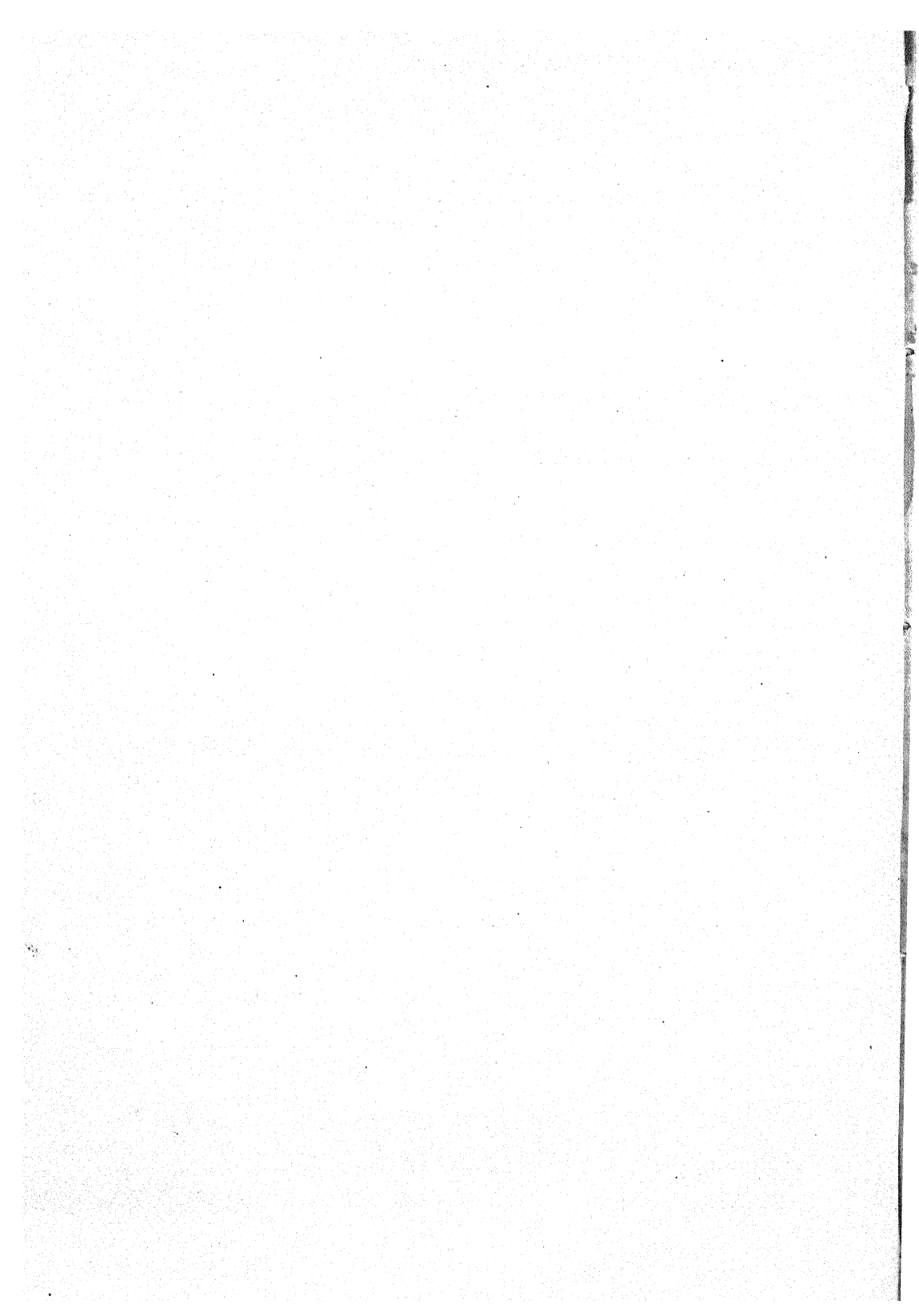
756. SIMMONDS, C. Possible new sources of power alcohol. *Nature* 106: 244-245. 1920.—Two reports of British committees are referred to. Foodstuffs will probably be too valuable for yet some time for use on any large scale as sources of alcohol. It has been suggested that there is in Ireland considerable waste land which could be used for crops to be used in this way, and some work has been started in this direction. In tropical regions cassava, arrowroot, and maize might be practicable. One plant (*Polymnia edulis*) from the Andes is said to be under trial in France. Utilization of cellulose materials, such as straw and sawdust, is also considered.—*O. A. Stevens*.

757. SLADE, R. E., AND G. I. HIGSON. A simple apparatus for high-power photomicrography. *Sci. Prog.* [London] 14: 645-646. 1920.—An apparatus designed for the rapid production of photomicrographs of emulsions.—*J. L. Weimer*.

758. SPRINGER, J. F. Water pipes of wood. *Sci. Amer.* 123: 250, 262, 264. 3 fig. 1920.

759. TEVIS, M. Forty centuries ago—and now. *Sci. Amer.* 123: 397. 1920.—The paper concerns the possibility of again making paper from *Papyrus*.—*Chas. H. Otis*.

760. WINTERS, S. R. Binder twine from Florida. *Sci. Amer.* 123: 379. 2 fig. 1920.—A brief article on sisal.—*Chas. H. Otis*.



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(See also in this issue Entries 896, 1070, 1078, 1087, 1091, 1092, 1093, 1166, 1283, 1345, 1378, 1379, 1380, 1381, 1398, 1399, 1412, 1413, 1415, 1416, 1417, 1418, 1419, 1421, 1422, 1424, 1425, 1426, 1427, 1476, 1484, 1485, 1496, 1512, 1515, 1519, 1520, 1521, 1522, 1523, 1524, 1527, 1528, 1529.)

761. ANONYMOUS. El cultivo del henequen en Yucatán, su posible introduccion en el estado de Michoacan. [Henequen in Yucatan and its possible introduction into Michoacan.] Michoacan Agric. [Mexico] 1^o: 4-5; 1^o: 4-5; 1^o: 5-6. 1920.—Popular information.—*John A. Stevenson*.

762. ANONYMOUS. Cultivo de la papa. [Potato cultivation.] Michoacan Agric. [Mexico] 1^o: 7; 1^o: 5-6. 1920.—Popular information.—*John A. Stevenson*.

763. ANONYMOUS. El cultivo del tabaco en España. [Tobacco cultivation in Spain.] Informacion Agric. [Madrid] 10: 484-486. 1920.—An outline of a proposed plan for growing tobacco under government supervision, with guaranteed returns to growers.—*John A. Stevenson*.

764. ANONYMOUS. Flax growing. Jour. Dept. Agric. Ireland 20: 520-523. 1920.

765. ANONYMOUS. [Rev. of: GEHRS, J. H. Productive agriculture. xii + 444 p. The Macmillan Co.: New York, 1918.] Sci. Prog. [London] 15: 148. 1920.

766. BAILEY, E. M. Report on commercial feeding stuffs. 1919. Connecticut [New Haven] Agric. Exp. Sta. Bull. 221. 345-393. 1920.—The analyses of 204 samples of feeds are given as required by State law. These analyses are preceded by a general discussion of the determining factors in compounding rations and definitions of feeding stuffs, as revised to Jan., 1919, and adopted by the Association of Feed Control Officials of the United States.—*Henry Dorsey*.

767. BARBER, C. A. Sugar production in India. Louisiana Planter and Sugar Manufacturer 64: 286. 1920.—While the acreage in sugar cane in India is very large, the production of sugar is very low. This is largely due to climatic conditions which prevent the growing of varieties which have been found most satisfactory in other countries.—*C. W. Edgerton*.

768. BARBILLON, M. Possibilities of new fibres for pulp and paper making. Paper 26²¹: 11-12, 32. 1920.—This article discusses esparto, bamboo, papyrus, broom, nettle, and other plants which are grown in France or its colonies and possess paper-making possibilities.—H. N. Lee.

769. BECKER-DILLINGEN, J. Serologische Untersuchungen auf dem Gebiete von Pflanzenbau und Pflanzenzucht. [Serum investigations in the field of plant structure and plant breeding.] Landw. Jahrb. 53: 245-276. 1919.—The author uses the serum and antigene method to determine impurities in meal and in seeds. He describes in detail the methods of preparing the antigene and the serum and reviews the literature. He finds that it is possible to make a quantitative determination of the amounts of *Agrostemma githago* seed in meal, an admixture of 0.125 per cent giving a specific reaction. Other common weed seeds as well as mixtures of weed seeds were studied with similar conclusions. The source of red clover seed could be determined in this way by noting the specific reaction due to the presence of characteristic weed seeds. By this method the seeds of *Brassica napus* could be distinguished from those of *Brassica rapa*, and the author was even able to distinguish between 2 different varieties of barley by making a serum test with the ground seed. All methods are described in detail since much of the success of the operation is said to depend on the proportions of antigene and serum.—A. J. Pieters.

770. BERRY, REGINALD ARTHUR. Composition and properties of oat grain and straw. Jour. Agric. Sci. 10: 359-414. Fig. 1-5. 1920.—An extensive study with detailed chemical analyses of the composition of oat grain and straw. Changes during growth, varietal differences, and a large number of correlations of various properties are brought out.—V. H. Young.

771. CERECEDA, J. DANTIN. Catalogo methodico de las plantas cultivadas (especies y variedades) en España y de las principales especies arboreas. [Methodical catalogue of the plants (species and varieties) cultivated in Spain, and of the principal tree species.] 62 p., 22 fig. Servicio de Publicaciones de Agricolas del Ministerio de Fomento: Madrid, 1920.—The classified list gives the botanical and common names for each species and variety cultivated in Spain. The species are grouped according to economic use except in the case of fruit trees, which are exemplified by olive and oranges, and sugar and cereals, which are grouped with reference to climatic adaptations.—C. V. Piper.

772. CLAYTON, E. S. Field experiments with maize. Grafton experiment farm, 1919-1920. Agric. Gaz. New South Wales 32: 1-6. 1921.—In the experiment, hilling vs. flat cultivation of maize, hilling was done by the plow and by disc cultivating. Hilling by plowing decreased the crop but hilling by disc cultivating showed a net increase of crop over the check plats. The main advantage of hilling is that it smothers weeds in the row.—An experiment in de-suckering Leaming maize showed a net loss of about \$1.40 per acre.—In depth of cultivation experiments, deep cultivation during season and deep cultivation followed by shallow cultivation were compared with continuous shallow cultivation. Deep cultivation resulted in loss, and deep followed by shallow cultivation resulted in a small net gain.—In green manuring experiments, the object was to determine value of green manures sown in standing maize at tasseling time where maize is grown as a continuous crop. In the first year of experimenting, rape, vetches, and Grey field peas were used as green manuring crops; yields, when compared with plat receiving usual treatment, were not lessened the first year.—In a late cultivation experiment, maize received no cultivation after hilling (crop 18 inches high) in comparison with usual cultivation after hilling. The latter showed marked net gain per acre.—In rate of seeding trials with 2 varieties, the heavier seedings gave greatest net increases per acre.—L. R. Waldron.

773. CROCKER, WILLIAM. Influence of a crop on succeeding one. [Rev. of: (1) HARTWELL, B. L., and S. C. DAMON. The influence of crop plants on those which follow. Rhode Island Agric. Exp. Sta. Bull. 175. 1918. (2) HARTWELL, B. L., F. R. PEMBER, and G. E. MERKLE. The influence of crop plants on those which follow. Rhode Island Agric. Exp. Sta. Bull. 176. 1919 (see Bot. Absts. 6, Entry 18).] Bot. Gaz. 68: 480-482. 1919.

774. CROSS, WILLIAM E. Ensayos con abonas para la caña de azúcar. [Fertilizers for sugar cane.] Sugar 21: 267-271. 1919.—A discussion of the fertilizer experiments at the Tucuman (Argentina) Experiment Station.—C. W. Edgerton.

775. CROSS, WILLIAM E. Fertilizer experiments with sugar cane in 1918-19. Sugar 21: 633-634, 651. 1919. [A translation from Rev. Indust. Agric. Tucuman 9: Nos. 11-12, 1919.]—A discussion of the effect of various fertilizers upon the development of sugar cane and upon the root-rot disease.—C. W. Edgerton.

776. CROSS, WILLIAM E. The 1919 Tucuman sugar crop. Louisiana Planter and Sugar Manufacturer 64: 364-366. 2 fig. 1920.—Tucuman produced 3,685,000 tons of sugar cane in 1919, this crop being much larger than each of several preceding crops. This increased production is said to be due to the fact that the planters have replaced the native canes with Java seedlings. The Java seedlings are more resistant to the attacks of insects and fungous diseases. Neither mosaic nor root-rot seems to seriously damage these canes.—C. W. Edgerton.

777. CROSS, WILLIAM E. The treatment of cane damaged by frost. Louisiana Planter and Sugar Manufacturer 65: 363-366. 1 fig. 1920.—A discussion of the methods to be used in harvesting frosted cane and of the difficulties that arise during the manufacture of sugar from such cane.—C. W. Edgerton.

778. EDQUIST, ALF. G. Vitality of seeds. Trans. and Proc. Roy. Soc. South Australia 40: 5-10. 1919.—As a result of preliminary experiments on the storage of dry grain, it has been found that perfectly ripe dry grain can be stored in an atmosphere of nitrogen or of carbon dioxide without injury to the grain; at the same time the eggs of weevils and other beetles are prevented from developing. It is maintained that such a method of storage can be provided economically.—J. H. Faull.

779. FRUWIRTH, C. Handbuch des Hülsenfruchterbaues. [Handbook of legume culture.] viii + 231 p., 231 fig. Paul Parey: Berlin, 1921.—This work is in reality a third revised and enlarged edition of the author's "Anbau der Hülsenfrüchte." The general part considers such topics as morphology, physiology, cultural requirements, utilization and agricultural importance. The special part treats in detail many of the legume crop plants, including serradella, lupines, square-pod pea, chick-pea, vetches, lentils, vetchlings, peas, soybean, kidney bean, scarlet runner, mung, urd, lima bean, cowpea, and bonavist.—C. V. Piper.

780. GIL, MIGUEL. El problema del trigo-fertilización. [The problem of wheat fertilization.] Informacion Agric. [Madrid] 10: 482-484. 2 fig. 1920.—The results of tests with sodium nitrate are given.—John A. Stevenson.

781. GILMORE, MELVIN RANDOLPH. Uses of plants by the Indians of the Missouri River region. 33rd Annual Report of the Bureau of American Ethnology 1911-12: 43-154. 30 pl. Washington, D. C., 1919.—This is a list of the various plants, together with methods of utilization, used by the Indians in the region studied, being a continuation of similar accounts of other tribes (see Bureau of Ethnology Bull. 55, and 30th Rept.). A glossary of Indian, English, and scientific names of the plants mentioned is appended; also a bibliography of historical writers quoted.—Lyman Carrier.

782. GRAY, G. P. Weed control along fencerows and roadways. Monthly Bull. Dept. Agric. California 8: 599-603. 1919.—Refers to Publications in Agricultural Science, University of California, Vol. 4, No. 2, 1919. [See Bot. Absts. 3, Entry 470.]-E. L. Overholser.

783. GRIMME, CLEMENS. Ueber Mulatinhos, eine neue brasilianische Speisebohne. [Concerning mulatinhos, a new Brazilian edible bean.] Pharm. Zentralhalle 61: 421-423. 1920.—A chemical study of the mulatinhos bean is given. The bean, apparently a variety of *Phaseolus vulgaris* sub-spec. *compressus*, is small, light brown, and flat with a polished

seed-coat and a white, dark-bordered hilum. It is 10 mm. long, 6 mm. wide, and 3-5 mm. thick. The bean was found to contain 11 per cent of water, 89 per cent of dry substance, 85 per cent of organic substance, 34 per cent of crude protein, 2 per cent of fat, 46.4 per cent of nitrogen-free extract, 3.5 per cent of crude fiber, and 3.6 per cent of ash. After treating with water and then boiling, the contents were found to consist of 69.5 per cent of water, 30.5 per cent of dry substance, 29.6 per cent of organic substance, 10 per cent of crude protein, 0.35 per cent of fat, 18 per cent of nitrogen-free extractive matter, 1.16 per cent of crude fiber, and 0.9 per cent of ash. After boiling with sodium carbonate the respective figures were 75.1, 24.9, 24.1, 7.9, 0.17, 15.2, 0.82, and 0.8 per cent.—*H. Engelhardt.*

784. GROUD, CHARLES. Ramie and textile nettles as paper fiber. Paper 26¹³: 15-16, 30. 1920. [Translation from *Le Papier*, April, 1920.]

785. GUZMANES, ANTONIO. La immersion de las semillas en líquidos nutritivos. [Soaking seed in nutritive solutions.] *Informacion Agric.* [Madrid] 10: 480-481. 1920.—Seed barley soaked in a solution of ammonium nitrate or in a solution of potassium nitrate for various lengths of time gave lower yields than untreated seed.—*John A. Stevenson.*

786. GUZMANES, ANTONIO. El cultivo del arroz en Valencia. [Rice cultivation in Valencia.] *Informacion Agric.* [Madrid] 10: 453-457. 8 fig. 1920.

787. HARRIS, F. S. The American sugar-beet seed industry. Sugar 22: 68-69, 81. 5 fig. 1920.

788. HEIM, F., J. MAHEU, AND L. MATROD. Suitability of bagasse as a source of paper. Paper 26²³: 11-14, 36. 14 fig. 1920.—[Translation from *La Papeterie* 62: June-July, 1920.] A complete description of the histology of the stem, giving dimensions of the elements, the chemistry and microchemistry of the fiber, and properties and uses of pulp obtained therefrom.—*H. N. Lee.*

789. HODSON, E. A. Results of seven year's selection in Trice cotton. *Arkansas Agric. Exp. Sta. Bull.* 171. 27 p., 10 fig. 1920.—Seven years of continuous selection in Trice cotton showed that wide fluctuations occurred which emphasize the need of continuous selection in order to preserve the characters of the strain.—*John A. Elliott.*

790. JONES, D. F. Produccion de semillas para sembrar. [Seed production.] *El Agricultor* [Santiago, Chile] 5: 7-12. 8 fig. 1920.—[Reprinted from *La Hacienda*.]

791. JONES, J. S., C. W. COLVER, AND H. P. FISHBURN. The protein content of wheat grown with irrigation. *Jour. Agric. Sci.* 10: 290-332. Fig. 1-11. 1920.—The published data on the subject of protein content of wheat are very conflicting and the authors conducted a series of experiments during the years 1910-1916, inclusive, in an attempt to elucidate the problem. The work was carried out at Gooding, Idaho, in the Snake River valley. This is a region of low precipitation and for this reason the water applied to the crop as irrigation water was practically all that it received. Soils used varied from raw sagebrush land to that cultivated under rotation with legumes and other crops. Analyses of the nitrate and other mineral content of the soils were made and the effects of cropping, rotation, leaching, etc., were determined. Both the grain and the flour produced were analyzed throughout the experiments. Authors' results do not coincide with those obtained in many other experiments. They find that in general the wheat grown in the Snake River plains is soft, starchy, and low in protein content and of low value for milling purposes. It should not be assumed, however, that irrigation is the controlling factor in determining the protein content of wheat. Raw sage-brush soils, the nitrogen content of which is always low, produce wheat low in protein content regardless of the amount of water applied. As soon as such lands are cultivated to wheat in a rotation with alfalfa or red clover, a much better quality of wheat is produced, as such soils have a relatively higher nitrogen content and the protein

content of the wheat is correspondingly improved. Carelessness in the use of water may offset, to some extent, other favorable conditions since the maximum protein content was never obtained with the greatest amounts of irrigation water. Deterioration of seed due to growth in irrigated regions has no effect upon protein content of the crop and there is no advantage in securing seed from non-irrigated regions. However, there is much to be gained in selecting varieties of wheat having characteristically high protein content. Evidence suggests that from this point of view hard, red, spring wheat would be worth at least a trial.—*V. H. Young.*

792. KOFAHL, H. Der gehörnte Schotenklee. [The horned pod clover (*Lotus corniculatus*).] *Illus. Landw. Zeitg.* 41: 146-147. 1921.—This plant is recommended as a perennial leguminous forage plant in sections of Germany where alfalfa cannot be successfully grown. It grows best on a fertile soil having a clay subsoil and free from weeds, especially couch grass; it should be grown with oats or barley. The first cutting is the most productive. It appears to be long-lived and entirely resistant to winter killing. The best yield of seed is from the 2nd cutting. As forage, it is well liked by both cattle and swine.—*John W. Roberts.*

793. KRESS, OTTO. Cooking cotton hull fiber for pulp. *Paper* 25: 964-968, 1009-1011. 1920.

794. MAIDEN, J. H. Chats about the prickly pear. No. 8. *Agric. Gaz. New South Wales* 32: 45-48. 1 fig. 1921.—A discussion of extermination methods is presented. It has been found that cutting just below the surface of the ground, followed by thorough spraying with suitable poisons, generally kills the plant.—*L. R. Waldron.*

795. MAKIN, R. N. Farmers' experiment plots. Potato experiments, 1919-20, Cotta Walla-Crookwell District. *Agric. Gaz. New South Wales* 32: 7-9. 1921.—Variety trials carried on in cooperation with 3 farmers showed considerable variations in yield. One variety, Factor, yielded best, and Magnum Bonum and Early Manistee are recommended.—*L. R. Waldron.*

796. MALTE, M. O. Breeding methods in forage plants. *Sci. Agric. [Canada]* 1: 25-29. 1921.—A paper read before the Western Canadian Society of Agronomy and confined to breeding methods of a practical nature applicable to grasses, alfalfa, and red clover in Western Canada. Author found that in western rye grass (*Agropyrum tenerum* Vasey) and in other species of *Agropyrum*, self-fertilization regularly takes place. It is thus possible to work with many forms without the necessity of isolation. With alfalfa imperfect seed formation is due to defective sexual organs and frequently to unsuitable environmental conditions. In the case of red clover mass-selection brings results in a comparatively short time and is of practical importance.—*B. T. Dickson.*

797. NEIDIG, RAY E. Sugar beet top silage. *Jour. Agric. Res.* 20: 537-542. 1921.—Chemical analyses of average beet top silage, as found on the farm. Careless ensiling may allow abnormal fermentation, with possible production of substances toxic to animals.—*D. Reddick.*

798. OPAZO, ROBERTO. Cultivo y industria del azucar de betarraga. [Cultivation of the sugar beet.] *El Agricultor [Santiago, Chile]* 5: 120-122. 1920.—Discusses the possibility of a sugar beet industry in Chile.—*John A. Stevenson.*

799. OPAZO, ROBERTO. Cultivo de plantas oleaginosas. [Cultivation of oil plants.] *El Agricultor [Santiago, Chile]* 5: 195-198. 1920.—Discusses the cultivation of the peanut, sunflower, soybean, sesamum, and poppy as oil plants.—*John A. Stevenson.*

800. OPAZO, ROBERTO. Preparación de terrenos para la siembra de chacras. [Cultivation of small farms.] *El Agricultor [Santiago, Chile]* 5: 165-166. 1920.—Recommends seed selection of corn, sorghum, and other crops to be grown on small holdings and gives general cultural directions.—*John A. Stevenson.*

801. OPAZO, ROBERTO. Siembras de cebada y de avena. [Seeding barley and oats.] *El Agricultor [Santiago, Chile]* 5: 147-148. 1920.

802. OPAZO, ROBERTO. Siembras de trigo. [Planting wheat.] El Agricultor [Santiago, Chile] 5: 70-73. 1920.—A general discussion of wheat growing in Chile, including soil types, manner of sowing, fertilizers used, and cultivation methods.—*John A. Stevenson.*

803. PITT, J. M. Farmers' experiment plots. Summer fodder experiments, 1919-20. Central coast. Agric. Gaz. New South Wales 31: 805-808. 1 fig. 1920.—In cooperation with farmers, trials were conducted with Sudan grass, sachaline, Planter's Friend sorghum, and Japanese millet. The maximum yield, 36 tons of green fodder per acre, was secured from sachaline, plants attaining a height of 13 feet. Sudan grass grew 8 feet in 11 weeks.—*L. R. Waldron.*

804. PRIDHAM, J. T. Varieties of wheat tested in New South Wales. Agric. Gaz. New South Wales 32: 10-19. 1921.—A total of 249 varieties of wheat are listed, including 59 duplicates. Notes are given as to season, utilization, character of grain, origin, adaptations, defects, good points, and distinguishing characters.—*L. R. Waldron.*

805. QUEREAU, F. C. The amount of salt in irrigation water injurious to rice. Louisiana Agric. Exp. Sta. Bull. 171. 14 p., 8 fig. 1920.—Irrigation water is liable to contain salt during periods of drought. Pot and field experiments show that water containing 35 grains or more of salt to the gallon is liable to be injurious to rice.—*C. W. Edgerton.*

806. QUEREAU, F. C. Rice investigations. Louisiana Agric. Exp. Sta. Bull. 172. 87 p., 35 fig. 1920.—This bulletin discusses the various investigations that have been carried on with rice in the rice belt of Louisiana. In the fertilizer experiments, the best results were obtained with fertilizers that contained phosphoric acid. Potash does not seem to be necessary.—The rotation experiments showed that short rotations are not profitable, due to the high overhead expense necessitated by the change from rice to highland crops. The rotation recommended is 5-7 years in rice followed by the same period in other crops.—Red rice is one of the most important difficulties of the rice farmer. Methods for controlling red rice include rotation, use of cover crops, and pasturage. Crude oil has been found useful in controlling the root maggot. The principal rice diseases are rotten neck or blast (*Piricularia oryzae*) and straight head. The rotten neck disease occurs both in young and old plants. The straight head is most common on ground that produced a crop other than rice the preceding year. Straight head rarely develops in fields that have been drained during the season.—The best methods of growing, fertilizing, and harvesting rice are given. The estimated cost of growing an acre of rice in 1910 was \$27.26, while in 1917-1918 it was \$31.95.—*C. W. Edgerton.*

807. RINDL, M. Vegetable fats and oils. IV, and V. Semi-drying oils. South African Jour. Indust. 3: 518-531, 742-749. 1920.

808. RÍOS, P. GONZALEZ. La producción de nuevas variedades de caña. [The production of new cane varieties.] Sugar 21: 218-221. 8 fig. 1919.—Discusses the production of sugar cane seed and the growing of sugar cane seedlings.—*C. W. Edgerton.*

809. ROBERTS, HERBERT F. The relation of protein content to variety types in American wheat. Jour. Agric. Sci. 10: 121-134. 1920.—Author reviews and analyzes several papers on the protein content of American wheat and its relation to variety and climate. A short and comparatively dry growing season, especially in spring in the case of winter wheat, favors the development of grain high in protein content. Water supply is the most important factor in determining the starch-protein ratio. Higher rainfall or a greater amount of irrigation water increases the proportion of starch in wheat. The protein content of wheat increases from east to west with the exception of the Pacific Coast region, which in general produces wheat lowest in proteins. There is considerable variation in the starch-protein ratio within definite varieties. Mediterranean durums are highest, Russian durums are next, and bread wheats are lowest in protein content. In given regions the variation in protein content for

different varieties of wheat is from less than 1 per cent to more than 3 per cent. In many regions, the varieties most favored by farmers have been shown to be those varying most in the starch-protein ratio. This is true of Club wheat in California, and, in the order named, of Bluestem, Little Club, Turkey Red, Jones' Winter Fife, and Forty-fold in Washington. Since variation in protein is a varietal characteristic in wheat, author concludes that in breeding for general purposes, wheat strains should be sought which vary in the starch-protein ratio, since this indicates that they have a greater climatic adaptability. In breeding for a limited locality, wheat with a maximum protein content and with the least possible variation with respect thereto is to be sought.—V. H. Young.

810. ROSENFELD, ARTHUR H. Problems of cane fertilization. *Sugar* 21: 24-26, 118-119. 1919.—The results of several years' experiments with various fertilizers on sugar cane are not consistent and consequently none of the fertilizers tried is recommended. Rotation and the use of legumes are advocated.—C. W. Edgerton.

811. ROSENFELD, ARTHUR H. Further experiments in fertilizing cane. *Sugar* 22: 662-664. 1920.—No definite conclusions can be drawn from the various fertilizer experiments which have been conducted at the Tucuman (Argentina) Experiment Station, as the results have not been consistent.—C. W. Edgerton.

812. SCHROEDER, H. Die jährliche Gesamtproduktion der grünen Pflanzendecke der Erde. [The annual production of the vegetation of the globe.] *Naturwissenschaften* 7: 8-12, 23-29. 1919.—This is in reality a calculation of the total quantity of CO₂ consumed annually by green plants. The author briefly reviews previous papers and proceeds to consider the land surface of the globe as consisting of forest, agricultural land, steppe, and desert. For each of these divisions various calculations are made based upon available data together with such corrections as the author considers necessary. For instance, he takes Ebermayer's determination that in the Bavarian forests 3000 kgm. of carbon are fixed annually per hectare; taking into account the fact that the vast areas of circumpolar and mountain forests must fix less, although tropical and subtropical forests probably fix more, the author considers that this figure should be reduced by 1/6, and that 2500 kgm. per hectare is nearer a true average. Much space is devoted to a discussion of the principal crop plants, wheat, rye, barley, oats, maize, potatoes, and rice, and the author concludes that these plants fix 1600 kgm. of carbon per hectare annually. This figure includes grain, straw, and the roots and stubble left on the field. Forage crops, such as clovers, sorghums, peas, soybeans, green maize, as well as sugar, are believed to fix on the average about the same amount of carbon as the grains. Steppe and desert vegetation can only be estimated and there is a large margin of possible error. The final figures are given in table 15 (p. 27). To these he adds an estimate of the carbon fixed by the benthos, and arrives at 60 billion kgm., with limits of 50 and 80 billions, as the quantity of CO₂ annually consumed by green plants. Of these 60 billions, 40 are consumed by forest, 14 by agricultural, 4 by steppe, and 1 by desert plants. The author also discusses briefly the return of CO₂ to the air by decay and other means, but concludes that the quantitative data are too scanty to warrant even a guess. The total CO₂ of the atmosphere being 2100 billion kgm., it follows that unless replaced the available supply would be exhausted in about 30 years.—A. J. Pieters.

813. SHEPHERD, A. N. The Tick bean. (*Vicia faba*.) A green manure crop for irrigation areas. *Agric. Gaz. New South Wales* 32: 42-44. 2 fig. 1921.—Tick beans were grown on a plot in the Murrumbidgee irrigation area with good results. In consequence of several irrigations, over 15.5 tons of green crop—easily turned under—were produced per acre. It was calculated the crop returned to the land 145 pounds of nitrogen (as ammonia) per acre.—L. R. Waldron.

814. SMEDING, S. Ervaringen omtrent de cultuur op de in 1916 overstroomde gronden in de Anna Paulawnapolder. [Experiences on crop growing in the 1916 inundated lands of the Anna Paulawnapolder.] *Cultura* 32: 1-29, 60-64. 1920.—In 1916 some low lands in the prov-

ince of North Holland, Netherlands, were inundated by sea water. At first many farm crops could not be grown. The soil had to be cultivated thoroughly to prevent excessive evaporation due to capillary action, which would result in an increase of salt content toward the soil surface. Proper drainage by pumping machines was advised. Heavy soils rather than lighter ones were sensitive to deep plowing. Deep fall plowing on inundated lands is not advisable. Spring treatment of the soil must be superficial, and only the cultivator and harrow should be used to prepare the seed bed.—The first year sugar beets and mangel-wurzels proved resistant to salty soil; spring barley also succeeded; mustard did fairly well; alfalfa prospered only on lighter soils; red clover was everywhere poor. The growing of oats, peas, spinach, potatoes, and cabbage was impossible.—The second year, 1917, the soil contained less salt, though its structure was not normal. However, the early summer was dry and a good harvest was obtained from sugar beets, mangel-wurzel, spinach, radish, and spring barley; on lighter soils spring barley, mustard, red clover, and alfalfa did well; wheat, oats, and flax were fairly good; white and brown beans were a failure.—The third year, 1918, the salt had diminished to such an extent that it no longer affected field crops though the structure of the heavy soils still remained abnormal. On lighter soils good harvests of spinach, radish, oats, spring barley, cabbage, broad beans, and peas were obtained. On heavy soils most crops, including beets, were not as good as in the previous year.—*J. C. Th. Uphof.*

815. SOUTHWORTH, W. A study of the influence of the root system in promoting hardiness in alfalfa. *Sci. Agric. [Canada]* 1: 5-9. 1921.—A paper read before the Western Canadian Society of Agronomy dealing with experiments carried on at the Ontario and Manitoba Agricultural Colleges. Plants possessing a branched root system are better able to withstand winter heaving than those having only a single taproot. Plants which develop rooting underground stems are able to maintain themselves after the death of the main rootstock. When alfalfa has the habit of spreading by root proliferation, the plant is better able to recuperate from injury and to withstand cold. Such plants are usually less nutritious and palatable and work is in progress at the latter institution to remedy these defects.—*B. T. Dickson.*

816. STAPLEDON, R. G. Seed studies: red clover with special reference to the country of origin of the seed. *Jour. Agric. Sci.* 10: 90-120. 1920.—The country of origin of seeds of various cultivated plants is important in determining the value of the crop for various purposes. In England, clover seed from various sources varies greatly in the yield produced and the value of the crop. Home-grown seed appears to be best for most uses. To a certain extent the type of weed seeds found in clover is valuable in determining its source, but the source of cleaned and blended seed can hardly be determined in this way. Author has worked out a system of classification of seeds of red clover based on germinating power, average size, and proportion of different colored seeds. Seeds were classed according to color as yellow, violet, and brown, and the various color variations, mottlings, etc., included with each color are described. The proportion of "hard" seed was also determined. The results of an exhaustive study of seed from two seasons' crops has enabled the author to give definite criteria for the determination of the country of origin of clover seed and also has shown that there is a definite coordination between the physical characteristics of clover seed and its value for a definite purpose.—*V. H. Young.*

817. STENT, SYDNEY M. Kudzu (*Pueraria thunbergiana*). [Rev. of: PIPER, C. V. *Kudzu*. U. S. Dept. Agric. Dept. Circ. 89. 7 p. 1920 (see Bot. Absts. 6, Entry 1428).] *Jour. Dept. Agric. Union of South Africa* 1: 558-560. 1920.—Brief comment on adaptability and source of seed.—*E. M. Doidge.*

818. STIETZ, G. E. G. Sugar cane culture in Java. *Louisiana Planter and Sugar Manufacturer* 65: 219. 1920.

819. TAGGART, W. G. Louisiana seedling canes. *Sugar* 21: 426-429, 439. 1919.—The Louisiana Experiment Station has been growing seedling canes for a number of years. The seed was obtained from various tropical countries. Cane seed usually germinates very

poorly and generally only a few plants are obtained from a shipment of seed. Of the several hundred seedlings which have been grown, only a very few show particular merit. The most valuable seem to be the L 253 and L 511. The L 253 seedling produces a very heavy tonnage but the sugar content is no better than that of the native canes. The L 511 seedling is a cane richer in sucrose than any of the canes ordinarily grown in Louisiana.—*C. W. Edgerton.*

820. TAGUE, E. L. Changes taking place in the tempering of wheat. *Jour. Agric. Res.* 20: 271-275. 1920 [1921].—Improvement in the milling quality of wheat is effected by moistening the grain. Hard wheats are improved more than soft ones and dry wheats are improved more than wet ones. Improved milling quality of tempered wheat is due chiefly to physical changes. The optimum conditions are: Temperature 20 to 25°C., time 48 hours, moisture 15.5 per cent.—*D. Reddick.*

821. WEST, CLARENCE J. Paper from bagasse. *Paper* 26: 62-64. 1920.—A description of the method used in making paper pulp from sugar cane refuse.—*H. N. Lee.*

822. WEST, CLARENCE J. Possibilities of African grasses in paper manufacture. *Paper* 26¹⁶: 10. 1920.—A condensed analysis of African grasses, summarizing their possibilities in the manufacture of paper.—*H. N. Lee.*

823. ZAYAS, M. Cultivo de las judías. [Bean cultivation.] *Informacion Agric.* [Madrid] 10: 526-528. 2 fig. 1920.

BIBLIOGRAPHY, BIOGRAPHY, AND HISTORY

NEIL E. STEVENS, *Editor*

(See also in this issue Entries 781, 954, 1035, 1109, 1288, 1536, 1539, 1544)

824. ANONYMOUS. Canadian Branch of the American Phytopathological Society. *Sci. Agric.* 1: 18. 1921.—An account of the second annual meeting of the above branch held in the Biological Building at the Ontario Agricultural College on Dec. 9 and 10, 1920.—*B. T. Dickson.*

825. ANONYMOUS. Édouard Prillieux. *Ann. Service Épiphyties* 4: 1-16. *Portrait.* 1917 [1919].—Édouard Ernest Prillieux, "the founder of phytopathology in France," was born in Paris, Jan. 11, 1829, and died Oct. 6, 1915, at Mondoubleau (Loir-et-Cher). He was educated at the old Institut National Agronomique (1848-1853), and immediately devoted himself to the problems of vegetable pathology, particularly diseases of the vine. In 1887 he founded the Station de Pathologie Végétale at Paris, and in 1894 furthered the establishment of the Station Entomologique. A portion of the article is given to analysis of Prillieux' scientific researches, and there follows a classified list of his publications, 184 in number.—*M. F. Warner.*

826. ANONYMOUS. Die Forste und der Friedensvertrag. [Forests and the peace treaty.] *Allg. Forst- u. Jagdzeitg.* 38: 70. 1920.—Hungary loses over half of her coniferous forest to Roumania, 36 per cent to Czecho-Slovakia, and 11 per cent to Jugo-Slavia. The situation is similar in respect to beech and oak, so that the once well forested Hungary is reduced to a wood importing country.—*F. S. Baker.*

827. BARNHART, J. H. Brackenridge and his book on ferns. *Jour. New York Bot. Gard.* 20: 117-124. 1919.—This sketch of William D. Brackenridge (1810-1893) deals particularly with his part in the Wilkes Exploring Expedition and with the preparation of his work on ferns.—*Neil E. Stevens.*

828. BARNHART, J. H. Historical sketch of the Torrey Botanical Club. *Mem. Torrey Bot. Club* 17: 12-21. 1918.—This sketch deals especially with the formation and work of the

society and is followed by reminiscences of the early days and former members by, H. M. DENSLow (p. 22-23), N. L. BRITTON (p. 24-28), and ARTHUR HOLLICK (p. 29-30).—*Neil E. Stevens.*

829. BARNHART, J. H. Some fictitious botanists. *Jour. New York Bot. Gard.* 20: 171-181. 1919.—Fourteen so-called "botanists" from Appleton's *Cyclopedia of American Biography* are listed, and evidence is presented to show that their supposed biographical accounts are fictitious.—*Neil E. Stevens.*

830. BATESON, W[ILLIAM]. The late Mr. R. P. Gregory. *Nature* 102: 284. 1918.—See *Bot. Absts.* 5, Entry 1234.

831. BOIS, DÉSIRÉ. Notice sur M. Maurice Lévêque de Vilmorin. *Bull. Soc. Bot. France* 66: 140-143. 1919.—Auguste-Louis-Maurice Lévêque de Vilmorin (1849-1918) was especially interested in forest botany and the study of fruit and ornamental trees. A list of 20 of his publications is given.—*B. O. Dodge.*

832. BOULGER, G. S., AND JAMES BRITTEN. Joseph Andrews and his herbarium. *Jour. Botany* 56: 257-261. 1918.—The British Museum (Natural History) contains a collection of plants formed at Sudbury by the apothecary Joseph Andrews, between 1710 and 1757. Andrews was a friend of Dale, and probably the man appointed in 1707 as inspector of the Chelsea Garden, together with Wyche and Petiver. He is mentioned in Dillenius' edition of Ray's *Synopsis Methodica Plantarum Britannicarum*, ed. 3, 1724, though it is not certain that Dillenius was acquainted with Andrews, whose specimens are numbered in accordance with the 2d ed. of Ray's *Synopsis*, but Andrews owned a copy of the Dillenian edition, afterwards owned by the late W. A. Clarke, which contains a few marginal notes and references to other authors.—*M. F. Warner.*

833. B[OWER], F. O. Prof. William Gilson Farlow. *Nature* 103: 509. 1919.—See also *Bot. Absts.* 6, Entries 916, 947, 956, 963, 1463, 1470.

834. BRIQUET, JOHN. Notice sur la vie et les travaux botaniques de Louis Naville (1843-1916). *Ann. Conservatoire et Jard. Bot. Genève* 20: 215-221. *Portrait.* 1919.—Constant-Louis Naville of Geneva was a man of letters whose avocations were botany and mountain climbing. He made numerous explorations throughout the Swiss Alps, Savoy, and Dauphiny, collecting an herbarium of 3001 numbers, which he gave to the Conservatoire Botanique of Geneva. He published nothing save a popular article, "La flore du Salève," in 1885.—*M. F. Warner.*

835. BUNYARD, E. A. Cotton's "Planter's Manual." *Gard. Chron.* III, 63: 174-175. 1918.—Published in 1675, by Charles Cotton, known as a poet and for his association with Walton's *Compleat Angler*. Although from the preface it would appear that the book is by Cotton himself, it is actually a translation from the "Instructions pour les arbres fruitiers" first published 1653, by "M. R. T. P. D. S. M.," i.e., M. Robert Triquet, prieur de St. Marc, who in turn was only editor, as the preface states that the book was written by François Vautier, physician to Louis XIV.—*M. F. Warner.*

836. BUNYARD, E. A. Henry van Oosten and the "Dutch gardener." *Jour. Pomology* 1: 37-40. 1919.—For its pomological sources the "Dutch gardener" goes back to LA QUINTINYE, "Instructions pour les jardins potagers et fruitiers," pirated edition by DESBORDES, Amsterdam, 1699, which contains "L'Art de tailler les arbres fruitiers," condensed from VENETTE's book of the same title (1683). Mentions English translation of Venette (1685), and hints that it may have been by EVELYN, as certain phrases have "his unmistakeable ring about them." Mr. Bunyard does not give the earliest Dutch edition of van Oosten, but mentions the English ones of 1703 and 1711, the German of 1706 under title: "Niederlandischer blumen obst und orangeriegarten," the French under title: "Le jardin d' Hollande." He finds that van Oosten borrowed the material on oranges directly from La Quintinye himself.—*M. F. Warner.*

837. BUNYARD, E. A. The history of cultivated fruits, as told in the lives of great pomologists. Robert Thompson. Gard. Chron. III, 63: 121-122. *Portrait*. 1918.—“His work as a pomologist, especially in the rectification of nomenclature, places him in the first rank.” The present article deals with his work on the Catalogue of fruits cultivated in the Garden of the Horticultural Society of London, in the Pomological Magazine, Loudon's Encyclopaedia of gardening (new ed., 1835), in the Transactions of the Horticultural Society, and especially emphasizes the value of his “Gardener's assistant,” first published in 1859. Few details of his life are given, save the record from Thompson's own hand in the book at Chiswick, on his admission there Oct. 21, 1824, in which he states that he was born in the parish of Echt, in the County of Aberdeenshire, in the year 1799, and not 1798, which is commonly accepted as the date of his birth. He died in 1869. To this article is appended a letter from BRIAN WYNNE, giving some recollections of Thompson in his later years.—*M. F. Warner*.

838. BUNYARD, E. A. Some old English apples. Gard. Chron. III, 63: 219-220. 1918.—Keddleston Pippin, known in 1830, and in high favor in 1833; Gennet Moyle, still grown in Cornwall, dating back to Evelyn's day, and celebrated by Philipps in his poem on cider. The word Gennet is probably derived from the French Jeannette, and as our Juneating or Jenninget is probably from Gennet, the apple should therefore be spelled Genneting or Jenninget. The Old Pearmain, not identical with apple of same name in KNIGHT's “*Pomona Herefordiensis*,” Orange Pippin also differs from that figured by Hogg and Bull in the “*Herefordshire Pomona*.”—*M. F. Warner*.

839. CARDOT, JULES. [Letter to E. B. Chamberlain.] *Torreya* 19: 33. 1919.—Portion of a letter describing the devastation of his herbarium and library at Charleville, France, by the German invaders.—*Neil E. Stevens*

840. CARPENTIER, A. L'abbé Félix-Charles Hy (1853-1918). *Rev. Gén. Bot.* 30: 369-376. 1918.—Brief account of the life and work of M. Hy, for 40 years professor of botany at the Université Catholique of Angers. A chronological list of his publications is appended, 64 in number.—*Neil E. Stevens*.

841. CARQUEJA, BENTO. Barão de Soutelinho. *Broteria Ser. Bot.* 16: 25-28. *Portrait*. 1918.—ALFRED TAIT, Baron de Soutelinho, died March 16, 1917. He introduced many useful plants into Portugal. Was primarily a floriculturist, specializing on narcissus, chrysanthemums, and cactus dahlias. Rediscovered *Narcissus cyclamineus* in Portugal near Porto.—*M. F. Warner*.

842. CHODAT, ROBERT. Richard-Emile-Augustin de Candolle. *Arch. Sci. Phys. et Nat.* 2: 169-175. 1920.—Augustin de Candolle (1868-1920) was the fourth of a distinguished line of botanists, being preceded by his father, CASIMIR DE CANDOLLE, his grandfather, ALPHONSE DE CANDOLLE, and his great-grandfather, AUG.-PYR. DE CANDOLLE. The contributions of Augustin de Candolle to botanical science include physiology, morphology, and taxonomy. This account of his life by Professor Chodat is followed by a complete list of publications.—*J. H. Faull*.

843. CHURCH, A. H. Bibliographical notes, LXXIV. Baxter's ‘British phaenogamous botany.’ *Jour. Botany* 57: 58-63. 1919.—Issued in monthly parts of 4 plates and text, from Sept. 1832 to Mar. 1843, this issue being regarded as the first edition, and complete sets are inscribed second edition only on the title of the first volume. The reprint in 1856 was in no sense a third edition. The differences in title of the monthly parts and complete volumes are given, with dates and inclusive plate numbers for each of the 6 volumes. Author comments on the merits of the plates, and gives an estimate of the value of Baxter's work.—*M. F. Warner*.

844. COBE, RUTH. Periodical bibliographies and abstracts for the scientific and technological journals of the world. *Bull. Nation. Res. Council* 1: 131-154. 1920.—A partial list of serials regularly containing bibliographies or abstracts in various fields of science, each

title being given as a rule under all the subjects covered by it. Most of those relating to bibliography of Pathology are listed under Botany, but others of interest are given only under Bacteriology. The topics Agriculture and Forestry and Medical Sciences also include matter of interest to the botanist, but no place is provided for general biology or genetics.—*M. F. Warner.*

845. DELAUNAY, PAUL. Un botaniste manceau, Hector Léveillé (1863–1918). *Bull. Géog. Bot.* 27: 57–96. 1919.—An enthusiastic account, with bibliography, of the varied activities of l'abbé Leveillé not only in the field of botany, but in the organization of learned societies, and the study of anthropology, geography, history, biography, and archeology. As a botanist he was best known for his studies of regional floras.—*Neil E. Stevens.*

846. [DUDGEON, WINFIELD.] The Indian Botanical Society. 12 p. Allahabad, 1920.—This society "for uniting the botanists and promoting the botanical interests of India" was organized in 1920. The history of its organization together with the provisional constitution and list of charter members is here printed.—*Neil E. Stevens.*

847. DURHAM, H. E. Philological notes. *Gard. Chron.* III, 64: 146–147. 1918.—Origin and associations of the following: "Bloom," corresponding to the French "fleur," whence possibly some of the apples known as Belle Fleur; "pruine" from prune; the Pearmain or Parmayns, for which numerous derivations have been suggested, to which the author adds the possibility that the name may have come from the French "permaindre" or "parmaindre" (Latin "permanere"), because of the lasting quality of the fruits originally so called.—*M. F. Warner.*

848. DYKES, W. B. Did the tulip mania ever reach Italy? *Garden* 83: 528. 1919.—In response to an inquiry author says that Mattei in his article "I tulipani di Bologna," *Malpighia*, 1893, p. 15, states as a matter of course that when the mania was at its height in Holland in 1634 there were "maniacs" also in Florence, Bologna, and elsewhere.—*M. F. Warner.*

849. FAIRBRIDGE, DOROTHEA. Vergelegen. *South African Gard.* 9: 408–409. *Illus.* 1919.—An estate at Cape of Good Hope granted in 1700 to Governor WILLEM ADRIAAN VAN DER STEL, who cultivated here at the beginning of the 18th century a great variety of European vegetables, also interesting himself in food possibilities of the native plants. He grew tulips and Ceylon bulbs, and both he and his father, SIMON VAN DER STEL, sent quantities of Cape bulbs to Holland. He introduced the white mulberry into cultivation at the Cape. His manuscript on gardening, now in the South African Public Library, which was published in 1825 in the African Court calendar as an issue of the "African gardeners' and agriculturists' calendar," contains mention of diseases of fruit trees.—*M. F. Warner.*

850. FAIRCHILD, DAVID. Byron David Halsted, botanist (1852–1918). *Phytopath.* 9: 1–6. *Portrait.* 1919.—An intimate and interesting personal sketch of Dr. Halsted and his methods of work, by his nephew.—*Neil E. Stevens.*

851. FARQUHARSON, C. O. Charles Ogilvie Farquharson and his work in West Africa. *Kew Bull. Misc. Inform.* 1918: 353–361. 1918.—Letter to the Assistant Director at Kew, with prefatory note stating that Farquharson died Oct. 3, 1918. "A remarkably graphic epitome of his life work in Nigeria. The nature of the work, the methods by which he sought to solve the many difficult problems, and the kind of education that his experience had led him to believe best for such work are all fully discussed."—*M. F. Warner.*

852. FLETCHER, S. W. One hundred years of strawberry growing in North America. *Proc. Amer. Pomol. Soc.* 35: 125–132. 1918.—Commercial history. Although native berries abounded, and plants were brought from the fields and cultivated by the colonists as early as 1700, there was no attempt to grow for the market until after 1800.—*M. F. Warner.*

853. FOX, R. H. Dr. John Fothergill and his friends (chapters in eighteenth century life). *xxiv + 434 p., frontispiece, plates, portraits.* Macmillan & Co., Ltd.: London, 1919.—See Bot. Absts: 6, Entry 911.

854. GEDDES, PATRICK. The life and work of Sir Jagadis C. Bose. *xii + 259 p., frontispiece, illus., pl., portrait.* Longmans, Green & Co.: London, New York, 1920.—The education of Dr. Bose (born 1858) and his researches on the irritability of plants and related subjects are discussed. The two concluding chapters are devoted to a description of the Bose Institute, and to the address delivered by Dr. Bose at its dedication. [See Bot. Absts. 8, Entry 58].—Neil E. Stevens.

855. GIRARD, A. C. Achille Müntz, 1846–1917. *Ann. Inst. Nation. Agron. II, 13: 171–217. Portrait.* 1918.—Charles-Achille Muntz was connected with the Institut National Agronomique at Paris from 1876 to the close of his life. He was primarily an agricultural chemist, but among his nearly 300 publications listed on p. 206–217 are many on crop plants and physiology.—Neil E. Stevens.

856. GRAVES, F. M. On the walled garden. *Gard. Chron. III, 65: 105–106.* 1919.—Translated from "Le Menagier de Paris," written between June 1392 and September 1394, and published by the Société des Bibliophiles Français in 1846. The present portion, translated from the section on "Courtillage," deals with the cultivation of vegetables, flowers, and herbs, indicating the extensive number of plants then cultivated, with brief suggestions on grafting.—M. F. Warner.

857. GRINDLEY, F. H. The history, progress and future of the C. S. T. A. *Sci. Agric. 1: 10–12.* 1921.—An account by the General Secretary-Treasurer of the formation of the Canadian Society of Technical Agriculturists. The Society aims at raising the status of scientific agriculture in Canada and, by means of its official organ "Scientific Agriculture," giving publicity to experimentation and research carried on not only in Canada, but elsewhere when applicable to Canadian conditions.—B. T. Dickson.

858. G[ROVE], W. B. James Eustace Bagnall, A. L. S. (1830–1918). *Jour. Botany 56: 354–356.* 1918.—His active life spent in business in Birmingham, his recreations were the study of the local flora and of mosses. Wrote: "Handbook of mosses" (1886); "The Flora of Warwickshire" (1891); "The Flora of Staffordshire" (1901), and numerous articles in journals.—M. F. Warner.

859. GÜSSOW, H. T. Establishment of an Imperial (British) bureau of mycology. *Phytopath. 9: 265.* 1919.

860. HABERLANDT, GOTTLIEB. Grabrede auf Simon Schwendener am 2 Juni 1919. [Funeral oration for Simon Schwendener.]. *Naturwiss. Wochenschr. N. F., 18: 417.* 1919.

861. HEDRICK, U. P. Edward Lewis Sturtevant. *Rept. New York Agric. Exp. Sta. [Geneva] 1919: 1–16. Portrait.* 1919 [1920]. Published as 27th Ann. Rept. New York State Dept. Agric. Vol. 2, part 2.—"Edward Lewis Sturtevant, farmer, botanist, physician, and author was one of the giants of his time in the science of agriculture." Born, Jan. 23, 1842, died, Jan. 19, 1879. Educated at Bowdoin and Harvard Medical School. Conducted systematic experiments privately 1875–1880. Director New York State Agricultural Experiment Station 1882–1887. A bibliography of 89 titles covering his principal scientific writings is appended.—D. Reddick.

862. HEDRICK, U. P., Editor. Sturtevant's notes on edible plants. *Rept. New York Agric. Exp. Sta. [Geneva] 1919: 17–686.* 1919 [1920]. Published as 27th Ann. Rept. New York State Dept. Agric. Vol. 2, part 2.—Materials selected from following sources: An extensive manuscript owned by the New York Experiment Station, a mass of index cards located there and at the Missouri Botanical Garden, and Sturtevant's published work on the history

of esculents in the Station reports and American Naturalist. The researches into the origin and development of cultivated plants have been combined with hundreds of notes on local and aboriginal uses as food, and arranged in a single alphabet under specific names of plants, with bibliographical citations reduced to footnotes and a list of "Authors and titles quoted in Sturtevant's notes on edible plants" appended (p. 625-667). Separate indexes to botanical synonyms and vernacular names.—*D. Reddick.*

863. HENRIQUES, J. A. J. F. Correa da Serra. *Broteria Ser. Bot.* 16: 104-112. 1918.—José Francisco Correa da Serra was born at Serpa June 6, 1750, and died in 1823. Although an ecclesiastic, he held several diplomatic positions, among them that of Minister of Portugal to the United States. As naturalist he was especially interested in geology and botany, publishing papers in the latter subject in *Ann. Mus. Hist. Nat. Paris*, *Phil. Trans. Roy. Soc. London*, *Trans. Amer. Phil. Soc.*, and other journals.—*M. F. Warner.*

864. HENRY, AUGUSTINE. The cedars of Lebanon. References to the trees of great age that form the nucleus of the historic grove. *Sci. Amer. Suppl.* 87: 295. 1919. (From *Country Life* [London].)—The grove of cedars near Bsherreh has been celebrated for centuries, and many travellers have counted its principal trees, which have gradually decreased in number. BELON visited Mount Lebanon in 1550 and counted 28 great trees, while Sir JOSEPH HOOKER in 1860 found 15 which he judged to be the remainder of these. Both Hooker and GADEAU DE KERVILLE, who was there in 1908, measured some of the great trees, the former estimating that the largest might be 2500 years old. But from a specimen in the Kew museum showing 235 annual rings, Hooker's 2 largest trees, with a girth of 13 feet, would be about 2330 years old.—*M. F. Warner.*

865. JACOB, JOSEPH. "Pritzel." "A florist's plea to the powers that be." *Garden* 83: 118-119. 1919.—In regard to extending the scope of the new edition of the "*Iconum botanicarum index*" which has been undertaken by the Royal Horticultural Society.—*Neil E. Stevens.*

866. JACOB, JOSEPH. The wheat-ear carnation. *Garden* 83: 300-301. 1. fig. 1919.—Apropos of a paper on this subject in the *Carnation Year Book* for 1919, author goes back to CASTELL's "*Exactissima descriptio rariorum quarundam plantarum, quae continentur Romae in Horto Farnesiano*" (1625), and reproduces the drawing of "*Caryophyllus spicatus*" from the 11th chapter. He also cites LINNE, "*Hortus Cliffortianus*" (1737); WEINMANN, "*Phytanthozaiconographia*" (1739); and *Bot. Mag.* (1814), plate 1622, for illustrations of the same phenomenon.—*M. F. Warner.*

867. JENNINGS, O. E. John Adolph Shafer. *Trillia* 5: 3-7. 1919.—Born 1863, died 1918.—*M. F. Warner.*

868. JUEL, H. O. *Hortus Linnaeanus*. An enumeration of the plants cultivated in the Botanical garden of Upsala during the Linnean period. *Skrifter Svenska Linné Sällsk.* 1: 1-127. 1919.—Linnaeus was in charge of the garden at Upsala from 1742 until at least 1776, when his son may have taken over its care. The present list of 2157 species is compiled from books and papers of father and son, the titles of which are given in chronological order on p. 6-8.—*M. F. Warner.*

869. KELLY, H. A., AND W. L. BURRAGE. *American medical biographies*. xix + 1320 p. Norman, Remington Co.: Baltimore, 1920.—In selecting the more than 1900 names here included the principle of the editors has been "to include every man who has in any way contributed to the advancement of medicine in the United States or in Canada, or who, being a physician, has become illustrious in some other field of general science or in literature." This policy together with the senior editor's special interest in botany and medical botanists makes this a valuable reference book for botanical biography. Biographical sketches are given of the botanists listed below. In some cases this is the only readily available biography of the subject, many of the sketches contain new material, and all are prepared by competent

authors. Numerous citations of literature are given. Timothy Field Allen (1837-1902), Benjamin Smith Barton (1766-1815), William Paul Crillon Barton (1786-1856), John Bartram (1699-1777), Lewis Caleb Beck (1798-1853), Jacob Bigelow (1787-1879), John Shaw Billings (1838-1913), Reed Brockway Bontecou (1824-1907), Charles Miller Booth (1830-1906), John Brickell (1710?-1745), John Brickell (1749-1809), Robert Bridges (1806-1882), Joseph Carson (1808-1876), Jonathan Carver (1710-1780), Alvan Wentworth Chapman (1809-1899), John Clayton (1693-1773), Cadwalader Colden (1688-1776), Alva Curtis (1797-1881), William Darlington (1782-1863), Chester Dewey (1784-1867), Solomon Drowne (1753-1834), John Eberle (1787-1838), James Eights (1798-1882), Jared Eliot (1685-1763), Gouverneur Emerson (1795-1874), George Engelmann (1809-1884), Abram Paschal Garber (1838-1881), Alexander Garden (1728-1791), Jean Francois Gaultier (1708-1756), Lewis Reeve Gibbes (1810-1894), William Peters Gibbons (1812-1897), Asa Gray (1810-1888), Jacob Green (1790-1841), Traill Green (1813-1897), Robert Eglesfeld Griffith (1798-1850), Seth Hastings (1780-1861), Louis Hebert (died 1627), William S. Herbst (1833-1906), Constantine Hering (1800-1880), John Philip Hiester (1803-1854), Thomas Horsfield (1773-1859), David Hosack (1769-1835), Benjamin Franklin Hough (1822-1885), Elliot C. Howe (1828-1899), John Gibbons Hunt (1826-1893), Eli Ives (1779-1861), Laurence Johnson (1845-1893), Albert Kellogg (1813-1887), Peter D. Knieskern (1798-1871), Adam Kuhn (1741-1817), John Locke (1792-1856), Moses Marshall (1758-1813), James Mease (1771-1846), Joseph Hinson Mellichamp (1829-1903), Ezra Michener (1794-1887), John Mitchell (1680?-1768), Samuel Latham Mitchell (1764-1831), Isaac Shoemaker Moyer (1838-1898), John Strong Newberry (1822-1892), Charles Christopher Parry (1823-1890), William Dandridge Peck (1763-1822), David Lewis Phares (1817-1892), Charles Pickering (1805-1878), Richard Upton Piper (1816-1897), Zina Pitcher (1797-1872), Francis Peyre Porcher (1825-1895), Alyre Raffeneau-Delile (1778-1850), Isaac Rand (1743-1822), George Abraham Rex (1845-1895), John Leonard Riddell (1807-1867), James Watson Robbins (1801-1879), James Henry Salisbury (1823-1905), Michel S. Sarrazin (1659-1734), Henry Parker Sartwell (1792-1867), John Linnaeus Edward Whitridge Shecut (1770-1836), Charles Wilkins Short (1794-1863), George Smith (1804-1882), Peter Smith (1753-1816), Thomas Taylor (1820-1910), James Thacher (1754-1844), A. S. Todd (1798-1883), John Torrey (1796-1873), William Tully (1785-1859), George Vasey (1822-1893), Benjamin Vaughan (1751-1835), John Aston Warder (1813-1833), Charles Abiathar White (1826-1910), Frederick Adolphus Wislizenus (1810-1889), Christopher Witt (1675-1765), Thomas Fanning Wood (1841-1892), William Zollickoffer (1793-1853).—*Neil E. Stevens.*

870. KILLERMANN, S[EBASTIAN]. Die Herkunft und Einführung unserer Gartenbohne (*Phaseolus vulgaris* L.). [The origin and introduction of our garden bean.] *Naturwiss. Wochenschr.* N. F., 18: 305-312. *Fig. 1-2.* 1919.—An introduction from America, which took an important place in European gardens early in the 16th century. Early literature is cited and discussed.—*B. O. Dodge.*

871. KILLERMANN, S[EBASTIAN]. Die Herkunft des Kalmus (*Acorus calamus* L.). [The origin of sweet flag.] *Naturwiss. Wochenschr.* N. F., 18: 633-637. *1 fig.* 1919.—Citations and discussion of early references to this plant.—*B. O. Dodge.*

872. KILLERMANN, S[EBASTIAN]. Zur Geschichte der Ananas und Agave. [On the history of the pine-apple and agave.] *Naturwiss. Wochenschr.* N. F., 17: 497-503. *Fig. 1-3.* 1918.—Citations and discussion of early literature on these plants.—*B. O. Dodge.*

873. KILLERMANN, S[EBASTIAN]. Zur Geschichte der Johannis- und Stachelbeere. [On the history of the currant and gooseberry.] *Naturwiss. Wochenschr.* N. F., 18: 344-347. *Fig. 1-2.* 1919.—Records of the currant are found as far back as the fifteenth century, and of the gooseberry as far back as the sixteenth century.—*B. O. Dodge.*

874. KILLERMANN, S[EBASTIAN]. Zur Geschichte der Kakteen. [On the history of cacti.] *Naturwiss. Wochenschr.* N. F., 18: 665-668. 1919.—Numerous early references to cacti are cited and discussed.—*B. O. Dodge.*

875. KRZYMOWSKI, RICHARD. Die agrarhistorischen Theorien Eduard Hahns. [The agricultural history theories of Eduard Hahn.] Landw. Jahrb. 53: 485-499. 1919.—The Hahn theory of the development of agriculture is based on the supposition that the early humans were vegetarians or vegetable collectors and that they divided into hunters and fishermen. The choppers, or woodsmen, came from both the fisherfolk and the vegetable collectors, and from the woodsmen developed the horticulturists and agriculturists. The latest group in this development was the herdsmen, or flock masters, who developed from the agriculturists. The theory is opposed to the common conception that the first peoples were hunters and fishermen, then nomads, and finally agriculturists.—*Lyman Carrier.*

876. LAUFER, BERTHOLD. Sino-Iranica; Chinese contributions to the history of civilization in ancient Iran, with special reference to the history of cultivated plants and products. Field Mus. Nat. Hist. Publ. Anthropol. Ser. 15: iv + 185-630. 1919.—The following are traced in their migration from Persia to China (Sino-Iranica), or from China to Persia (Irano-Sinica): Alfalfa, grape-vine, pistachio, walnut, pomegranate, sesame and flax, coriander, cucumber, chive, onion and shallot, garden pea and broad bean, saffron and turmeric, safflower, jasmine, henna, balsam-poplar, manna, asafoetida, galbanum, oak-galls, indigo, rice, pepper, sugar, myrobalan, the "gold-peach," fu-tse, Brassica, cummin, date-palm, spinach, sugar beet and lettuce, Ricinus, almond, fig, olive, cassia pods and carob, narcissus, balm of Gilead, watermelon, fenugreek, nux-vomica, carrot, aromatics, Malayan Po-se and its products.—*E. H. Groff.*

877. LECOMTE, HENRI. Édouard Bureau. Rev. Gén. Sci. 30: 97-98. 1919.—Professor Bureau (1830-1918) succeeded Tulasne as assistant to Brongniart at the Museum of Natural History (Paris), and was afterward professor of systematic botany in that institution for over 30 years. In addition to his studies on the morphology and taxonomy of flowering plants he was much interested in fossil botany.—*Neil E. Stevens.*

878. LIPMAN, J. G. Byron David Halsted. Proc. Amer. Soc. Hort. Sci. 15: 117. 1919. (From the "Voorhees farmer," October, 1918.)

879. LORTÉL, J. La transformation des jardins par la Convention en l'An II. [Transformation of gardens by the Convention in 1794.] Rev. Hort. 90: 109-110. 1 fig. 1918.—Efforts to stimulate food production in war time recall a similar attempt in 1794 to popularize vegetable growing. It was the original intention to use portions of the gardens of the Tuileries and Luxembourg, the Paris Museum of Natural History, and other places, for potato growing only, but the scope of the plan was broadened to include turnips, beets, pumpkins, and the Jerusalem artichoke.—*M. F. Warner.*

880. LOYER, MAURICE. Paul Chappellier (1822-1919). Bull. Soc. Nation. Acclimat. France 66: 329-330. Portrait. 1919.—Obituary notice. Chappellier experimented on improvement of food plants, notably the Chinese yam and *Stachys affinis*.—*Neil E. Stevens.*

881. MAIDEN, J. H. A contribution to a history of the Royal Society of New South Wales, (with information in regard to other New South Wales societies). Jour. and Proc. Roy. Soc. New South Wales 52: 215-361. 1918.—Details in regard to the following: Philosophical Society of Australasia (Dec. 1821-1822?), Agricultural Society of New South Wales (July 5, 1822-Feb. 22, 1826), Agricultural and Horticultural Society of New South Wales (Feb. 22, 1816-1836), Australian Society to Promote the Growth and Consumption of Colonial Produce and Manufactures (1830-1836), Australian Floral and Horticultural Society (1836-1848), Australasian Botanic and Horticultural Society (June 20, 1848-Dec. 8, 1856), Horticultural Improvement Society of New South Wales (Jan. 15, 1855-Dec. 8, 1856), Australian Horticultural and Agricultural Society (Dec. 8, 1856), Australian Philosophical Society (Jan. 19, 1850-July 30, 1855), Philosophical Society of New South Wales (July 30, 1855-Dec. 12, 1866), Royal Society of New South Wales (Dec. 12, 1866 to date). A summary of their proceedings is given, with titles of papers read.—*M. F. Warner.*

882. MARZELL, HEINRICH. Zur Kulturgeschichte des Schellkrautes. [On the history of the culture of celandine.] *Naturwiss. Wochenschr. N. F.*, 18: 601-604. 1919.—The medical uses of *Chelidonium majus* L. in the past are reviewed and early literature is cited.—*B. O. Dodge*.

883. MÖBIUS, MARTIN. Die Begründung der Pflanzengeographie durch Alexander von Humboldt. [The establishment of plant geography by Alexander von Humboldt.] *Naturwiss. Wochenschr. N. F.*, 18: 521-526. 1 fig. 1919.—An appreciation of the pioneer work of von Humboldt in this field, prepared in celebration of the one hundred fiftieth anniversary of his birth.—*B. O. Dodge*.

884. MORRIS, DANIEL. Botany and the Empire. *Gard. Chron.* III, 66: 156, 163-164, 175-176, 187-188, 205, 210-211. 1919.—Presidential address, Botanical Section, British Association for the Advancement of Science. [See *Bot. Absts.* 7, Entry 72, where author's name is incorrectly given as "J. C." Morris.]—*Neil E. Stevens*.

885. MURRILL, W. A. The lotus of ancient Egypt. *Jour. New York Bot. Gard.* 20: 231. 1919.—The plant known in America as "Egyptian lotus" was held sacred in India, China, and Japan, but never used as decorative motive by the ancient Egyptians.—*M. F. Warner*.

886. NEUMANN, FELIX. Leonhard Fuchs, physician and botanist, 1501-1566. *Ann. Rept. Smithsonian Inst.* 1917: 635-647. Pl. 1-7. 1919.

887. NUTTALL, ZELIA. The flower lovers and gardeners of ancient Mexico. *Jour. Internat. Gard. Club* 3: 364-379. *Illus.* 1919.—Great love of flowers was characteristic of the Mexicans from time immemorial, and a unique and ingenious botanical nomenclature is exhibited in the Nahuatl or Mexican tongue, in which certain words used as prefixes or suffixes to plant names convey information as to their qualities or habitats; this seems to be a legacy from a very old civilization. An episode of the reign of Montezuma is given showing high value placed on rare plants. Horticulturists and florists were of great importance. Sahagun's *Historia general de la Nueva España* is quoted, and drawings of Sahagun reproduced showing gardeners at work in sowing and transplanting, picking flowers and making floral designs. Specimen "flower songs" from the Nahuatl are also given.—*M. F. Warner*.

888. NUTTALL, ZELIA. The gardens of ancient Mexico. II. *Jour. Internat. Gard. Club* 3: 572-590. *Illus.* 1919 [1920].—Quotations are given from a detailed description of a native garden given by Cortés in his second letter to the Emperor Charles V in 1520, and from accounts of the gardens of Montezuma and those of Nezahualcoyotl at Texcoco. Plants observed by Hernandez in the gardens of Huaxtepec between 1570 and 1577 are mentioned. Description of the famous "Chinampas" or floating gardens, which are actually mud beds raised above the surface of the lagoon, on which vegetables and flowers for the markets of the city of Mexico are still grown at the present day, just as they were in the most remote times. There is, however, record of veritable floating gardens in the period about 1350-1400, when the Nahuas or Mexicans were required to deliver annually by way of tribute to the king of Atzcapotzalco, a raft planted with all the native trees and vegetables. [See preceding entry.]—*M. F. Warner*.

889. PAYNE, C. H. A bibliographical curiosity. *Gard. Chron.* III, 64: 7-8. 1918.—A work with title in both English and French: "The English flower garden—Le Jardin de fleurs anglais," which is without date, but in which the plates are reprints of those in the very rare "Compleat florist" of 1740.—*M. F. Warner*.

890. PAYNE, C. H. Captain Bernet. *Garden* 83: 15. 1919.—Bernet, born 1775, died 1855, was a retired army officer who began to grow seedling chrysanthemums at Toulouse in 1827. Before that time there had been little effort to obtain new varieties; Bernet in the first two years raised nearly 60, and from that time the improvement of the chrysanthemum was undertaken by many growers.—*M. F. Warner*.

891. PAYNE, C. H. *The chrysanthemum in China*. Gard. Chron. III, 64: 233-234. 1918.—An account by an early Jesuit missionary in 'Mémoires concernant l'histoire, les sciences, les arts, les mœurs, les usages, &c. des Chinois. Par les missionnaires de Pékin. Tome troisième. Paris, 1778.' A very modern discussion of the flower, strangely overlooked by other early writers on the chrysanthemum. The "Kiu-hoa" or "Chü-hwa" of the Chinese is identified with the *Matricaria* of Tournefort and other 17th and 18th century botanists, the *Chrysanthemum indicum* of the Botanical Magazine, and the *Anthemis grandiflora* of Ramatuelle, who was the first to describe it from European-grown seeds in 1792, at least 25 years after the account discussed, as this volume, though published in 1778, is dated at the end: "à Pékin ce 3 Novembre, 1767."—M. F. Warner.

892. P[AYNE], C. H. Old gardening books. Gard. Chron. III, 64: 111. 1918.—Apropos of gardening literature, "The Gentleman and Lady's Gardener" of ROBERT EDMEADE (1776) is noted, which is not only a catalogue of seeds and plants for sale by him, but contains cultural directions and a monthly calendar of operations, together with the Latin name of each plant according to the Linnean classification.—M. F. Warner.

893. PAYNE, C. H. Pierre Blancard. Garden 82: 475-476. 1918.—Blancard was born at Marseilles April 21, 1741, and died there March 16, 1826. On his return from his fifth voyage to the Orient he introduced the chrysanthemum into Europe in 1789; it soon spread throughout Provence, was grown at the Jardin des Plantes in Paris, and is said to have been sent to Kew by CELS. It bloomed for the first time in England at Colvill's nursery in Chelsea, and was first figured in the Botanical Magazine as t. 327.—M. F. Warner.

894. PAYNE, C. H. T'ao-Yüan-Ming. Garden 82: 444, 455. 1918.—Chinese litterateur and chrysanthemum lover (365-427 A.D.). Little is told of his cultivation of the flower, save that his favorite was the variety known as "Kiu-hwa-chü" or "Nine glories." Extracts from his writings, and allusions to him in works of other Chinese authors, are quoted.—M. F. Warner.

895. POLLACCI, GINO. In ricordo di Giovanni Briosi. Atti Ist. Bot. Univ. Pavia 17: iii-xvii. Portrait. 1920.—Born at Ferrara, April 26, 1846, died at Pavia, July 20, 1919.—Baccalaureate degree in engineering at the University of Ferrara. Studied also at Torino and Naples and went to Belgium and Germany for training in agriculture. Studied with Kraus and deBary. Founded the agricultural experiment station at Palermo in 1873 and gave a strong stimulus to studies in enology and vegetable pathology. In 1877 he was called to the chemico-agricultural station at Rome where he established an experimental vineyard, propagated 500 varieties of grapes and did much enological work. He was called to the chair of botany at the University of Pavia in 1883. Here he first put the botanical garden in order and reorganized the station for cryptogamic botany, of which he was director. He began the publication of "Atti" which now has reached its 250th memoir. Author of many papers on parasitic fungi and fungus diseases of plants. A leader of Italian botanists. A bibliography of 161 titles is appended.—D. Reddick.

896. RAVN, F. K. Experiments in plant culture in Denmark. Scottish Jour. Agric. 3: 207-214. 1920.—The first experiments by B. S. JÖRGENSEN in 1860 were largely modelled on those at Rothamsted. A famous pioneer in work with meadow plants was P. NIELSEN, who in 1886 was made director of the first Danish state experiment station for field work. Toward the last of the 19th century attempts were made to establish local experiments in plant culture. An outline of work at the present time is given under the following heads: I. The state experimental work in plant industry; II. Experiments conducted by the agricultural societies; III. Plant breeding in its relation to experimental work. [See also Bot. Absts. 8, Entry 69.]—M. F. Warner.

897. REDDICK, DONALD. Vern Bonham Stewart. Phytopath. 9: 111-113. Portrait. 1919.—A sketch of the life of V. B. Stewart (1888-1918) with a list of his botanical publications.—Neil E. Stevens.

898. R[ENDLE], A. B. [Anne Casimir Pyramus de Candolle.] *Jour. Botany* 57: 23-24. 1919.—His death on Oct. 3, 1918, "is for the systematic botanist the breaking of a link with the past." The son of Alphonse and grandson of Augustin Pyramus de Candolle, his botanical contributions had not the fundamental character of some of theirs, but he did useful work.—*Neil E. Stevens.*

899. RICHMOND, C. W. In memoriam—Edgar Alexander Mearns, 1856-1916. *Ann. Rept. Smithsonian Inst.* 1917: 649-662. *Portrait.* [1919].—Dr. Mearns collected plants extensively in various regions while on duty as surgeon in the U. S. A. and was naturalist on the Roosevelt expedition to Africa.—*Neil E. Stevens.*

900. ROBERTS, W. Brunton, of Birmingham. *Gard. Chron.* III, 64: 142. 1918.—The recently published "Catalogue of the Birmingham collection" of the Birmingham public library, includes the "Catalogue of plants, botanically arranged according to the system of Linnaeus" of John Brunton & Co., 83 High Street, Birmingham, 1777; also one of forest and fruit trees issued by Brunton & Forbes in 1782, and another catalogue of trees in 1787, when the firm was Brunton, Forbes & Hunter.—*M. F. Warner.*

901. ROBERTS, W. An eighteenth-century London seedsman. *Gard. Chron.* III, 63: 223. 1918.—"A Catalogue of several sorts of grass seeds, sold by Nathaniel Powell, at the King's Head, near Fetter Lane end, in Holborn, London," is a series of cultural directions, followed by "A Short account of the improvement of land by several sorts of seeds," by the same person, and, though without date, the format and typography place them in the early years of the 18th century. POWELL's name as seedsman at 39, Holborn, appeared in the London directories until 1771, and it is possible that he may have been the Nathaniel Powell whose death is recorded in the Gentleman's Magazine as taking place at Bristol on March 1, 1773. His catalogue deals almost exclusively with trefoil, clover, sainfoin, ryegrass, and lucerne, and Powell presents their advantages in a manner which suggests thorough observation and practical experience.—*M. F. Warner.*

902. [ROBERTS, W.] Florists' feasts; a 16th century custom; as old as gillyflowers and carnations. *The Times* [London] No. 43134 (June 24). 16. 1919.—Custom probably introduced to England by Flemish cloth manufacturers settling in 1597 at Norwich, and certainly flourishing as early as 1631, when RALPH KNEVET wrote a play, "Rhodion and Iris," for presentation at the Norwich florists' feast. Nearly all the exhibitions of flowers and fruits of the 18th and early 19th century were held at public houses, where an inexpensive "ordinary" was provided. Flowers, fruits, and vegetables of all sorts (tulips, carnations, auriculas, melons, gooseberries, and cabbages) were the subjects of competition, but with the institution in the 19th century of the Royal Horticultural Society and those of the various counties, these florists' feasts, having served their purpose in the encouragement of horticulture, disappeared.—*M. F. Warner.*

903. [ROBERTS, W.] Old gardening literature. *The Times* [London] Lit. Suppl. No. 872 (Oct. 3) 472. 1918.—Rare books on agriculture, gardening, and botany, sold during the past season, with note of some of the libraries rich in such literature.—*Neil E. Stevens.*

904. ROBERTS, W. Tulip Paul Diack. *Gard. Chron.* III, 64: 201. 1918.—In the second of his satires, "Love of Fame, the universal passion," the Rev. EDWARD YOUNG (best known as author of the "Night thoughts") deals poetically with this flower, and in his key says that "Paul Diack, who gave name to a tulip, was an honest, toping old citizen of London." The name is possibly of Dutch or Flemish origin, and may have been Dyck.—*M. F. Warner.*

905. ROBERTS, W. A Whitechapel botanical garden. *Gard. Chron.* III, 64: 245-246. *Fig. 98-99.* 1918.—The garden of WILLIAM BENNETT, "Cornfactor and Biscuit Baker," situated in Whitechapel Fields, next the half-way house to Stepney, only known from the auction catalogue of its contents, to be sold 27th March, 1766. A list of the botanical names

in this catalog is given, showing that several of these plants were grown by Bennett previous to the dates recorded for their introduction into Great Britain, as for instance *Selago spuria*, supposed to have been introduced in 1779, and *Pisonia aculeata* and *Ruellia ciliata*, in 1806. Although there is no other intimation of the fact, the large number of certain plants, e. g., 350 pineapples, suggests that Bennett may have traded in plants.—*M. F. Warner*.

906. SCHIPS, M. Lionardo da Vinci als Naturforscher. [Leonardo da Vinci as a naturalist.] Naturwiss. Wochenschr. N. F., 18: 256-259. 1919.

907. SCHRAMM, J. R. Botanical Abstracts. Science 49: 195-196. 1919.—An account of the organization of the Board of Control and the plans for this journal.—*Neil E. Stevens*.

908. SHEAR, C. L., and N. E. STEVENS. Plant pathology to-day. Sci. Monthly 7: 235-243. 1918.—The development of plant pathology, especially in America, is discussed and some of the significant papers are cited.—*B. O. Dodge*.

909. SIMMONS, J. R. The historic trees of Massachusetts. 8 vo., xxi + 139 p. Illus. Marshall Jones Company: Boston, 1919.

910. SINGLETON, ESTHER. The Shakespeare garden. Jour. Internat. Garden Club 3: 545-556. Illus. 1919 [1920].—Evolution of the garden of delight; plants proper to the English garden in ALEXANDER NECKAN's "De naturis rerum" (12th century), and those enumerated by JOHN DE GARLANDE and by GUILLAUME DE LORRIS in his "Roman de la Rose" in the 13th century; the formal garden, symbolism of gardens, and development of garden in Tudor times, are discussed, with many extracts from late 16th century literature.—*M. F. Warner*.

911. SPINDEN, H. J. Origin of American agriculture; ancient pottery reveals the invention and spread of agriculture in America. Sci. Amer. Suppl. 88: 120-121, 127. Illus. 1919.—"The most reliable information regarding the agriculture of the past lies in the pottery which was inseparably associated with it." Earliest records of cultivated plants are found in Mesopotamia, Egypt, Mexico, and Peru. Illustrations are from pottery in form of ears of maize (Mexican and Peruvian), and squashes (Peruvian).—*M. F. Warner*.

912. STEVENS, N. E. American botany and the great war. Science 48: 177-179. 1918.—Several incidental effects of the war on botanical work are mentioned, but the organization of phytopathologists for emergency work is given most attention.—*B. O. Dodge*.

913. SYDOW, HANS. Ferdinand Theissen, S. J. Ann Mycol. 17: 134-139. 1919 [1920].—An appreciation, with brief biography, of Ferdinand Thiessen (1877-1919). A bibliography of his 52 mycological contributions is appended. [See also Bot. Absts. 7, Entry 71.]—*H. S. Jackson*.

914. TONI, G. B. DE. Fabio Colonna e l'eterocarpia. Riv. Biol. 1: 46-49. 1919.—Colonna's observations on heterocarp. Many examples of this phenomenon are afforded by *Calendula*, and FUCHS in his "De historia stirpium commentarii" (1542) shows a figure of *C. officinalis* with akenes arranged in a semi-circle, but does not recognize the polymorphic nature of the fruit. Just 50 years later Fabio Colonna (1567-1640), in his first book, "Phytobasanos sive Plantarum aliquot historia" (1592) p. 52-59, describes and figures the plant called *Clymenon Dioscoridis*, now referred to *Calendula officinalis*, which he says is characterized by 3 different forms of fruits. This peculiarity of *C. officinalis* was later figured by ELIZABETH BLACKWELL in her "Curious herbal" (1739), by GAERTNER, "De fructibus et seminibus plantarum" (1788), and by POIRET in "Encyclopédie méthodique," Suppl. 5: 188. Tab. 715.—*M. F. Warner*.

915. TRUE, R. H. Notes on the early history of the pecan in America. Ann. Rept. Smithsonian Inst. 1917: 435-448. [1919].—A series of notes from unpublished or inaccessible sources, dealing with the discovery, introduction into Europe, botanical description, early cultivation, and improvement of the pecan.—*Neil E. Stevens*.

916. VAUPEL, FRIEDRICH. Karl Schmidt. Monatssehr. Kakteenk. 29: 73-74. 1 fig. 1919.—Karl Schmidt of the firm of Haage & Schmidt was born Dec. 23, 1848, and died Feb. 26, 1919, at Erfurt.—A. S. Hitchcock.

917. VIOLA, BARTHOLOMEW. The history of sugar. Louisiana Planter and Sugar Manufacturer 65: 379-381, 398-399. 5 fig. 1920.—A history of sugar and of sugar manufacture from very early times. The sugar cane industry is also traced from country to country.—C. W. Edgerton.

918. WARNER, M. F. Bibliographical opportunities in horticulture. Bull. Amer. Library Assoc. 13: 178-184. 1919.—The following are suggested as important and interesting lines of work in this field: Continuation of the check list of American horticultural books; the preparation of much needed indexes of horticultural periodicals; the collection of data on early American journals and societies; critical bibliographical work; and biographical and historical research.—Neil E. Stevens.

919. WARNER, M. F. Date of Robert Thompson's birth. Gard. Chron. III, 64: 116-117. 1918.—Mr. BUNYARD's sketch, March 23, 1918, quotes Thompson's own statement from the Chiswick records, that he was born in 1799, which would seem to be conclusive. But sketches in Journal of Horticulture in 1869 and 1877, while admitting that there is no birth register by which the precise date can be fixed, infer that it was in September, 1798, from the fact that his baptism occurred on the 16th of October of that year.—M. F. Warner.

920. WARNER, M. F. Horticultural libraries in the United States. Gard. Chron. III, 65: 247. 1919.—The collection of the Library of the U. S. Department of Agriculture in its relation to horticulture, with some comment on its administration and relation to other libraries.—Neil E. Stevens.

921. WHITE, O. E. Our common garden vegetables; their history and their origin. Brooklyn Bot. Gard. Leaflet VI, 3: 1-19. Fig. 1-5. 1918.—Popular account with list of common edible plants, their place of origin, and probable antiquity of cultivation.—Neil E. Stevens.

922. WICKSON, E. J. Beginnings of agricultural education and research in California. Rept. California Agric. Exp. Sta. 1917/18: 35-101. 1918.—Discusses the following: Plant introduction and distribution (p. 67-69); grasses and forage plants (p. 69-72), cereals (p. 72-74), forestry (p. 74-77), viticulture (p. 77-79), horticulture (p. 79-83), plant diseases (p. 86-88).—Neil E. Stevens.

923. WILDEMAN, ÉMILE DE. Alfred Cogniaux (1841-1916). Bull. Jard. Bot. Bruxelles 5: i-xxx. Portrait. 1919.—Account of life and botanical work of Cogniaux, who in later years devoted himself to the Cucurbitaceae, Melastomaceae, and Orchidaceae. A list of his works, in chronological order from 1863 to 1916, comprises over 150 titles.—Neil E. Stevens.

BOTANICAL EDUCATION

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ALFRED GUNDERSEN, *Assistant Editor*

(See also in this issue Entries 939, 1049, 1079, 1084, 1115)

924. ANONYMOUS. [Rev. of: DYMES, T. A. The nature study of plants in theory and practice for the hobby-botanist. xviii + 173 p., 54 fig. Society for Promoting Christian Knowledge: London, 1920.] Sci. Prog. [London] 15: 320. 1920.

925. ANONYMOUS. [Rev. of: DYMES, THOMAS ALFRED (Introduction by F. E. WEISS). The nature study of plants in theory and practice for the hobby-botanist. xviii + 173 p., 54 fig. Society for Promoting Christian Knowledge: London, 1920.] Jour. Botany 58: 277-278. 1920.

926. COOK, MEL. T. College botany. 392 p. J. B. Lippincott & Co.: Philadelphia, 1920.

927. DICKSON, B. T. Do our agricultural colleges educate? Sci. Agric. 1: 12-13. 1921.—This article is a plea for rational education and the consequent diminution of the importance of the final examination. The fundamental question is whether students are trained to think. The suggestion is made that the "seminar" method be used more, even in undergraduate courses, and that final examinations be replaced by unannounced tests during term, combined with carefully checked laboratory work.—*B. T. Dickson.*

928. HOLMBOE, JENS. Den botaniske afdeling. [The botanical section.] Bergens Mus. Aarsberetning 1917-1918: 36-44. 1918.—Annual report of development of herbarium, botanical garden, conservatory, and botanical laboratory.—*A. Gundersen.*

929. HOLMBOE, JENS. Den botaniske afdeling. [The botanical section.] Bergens Mus. Aarsberetning 1918-1919: 37-45. 1919.—Annual report.—*A. Gundersen.*

930. JONES, W. NEILSON, AND M. C. RAYNER. A text book of plant biology. viii + 262 p., 6 pl., 36 fig. Methuen & Co., Ltd.: London, 1920.

CYTOLOGY

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(See in this issue Entries 1096, 1103, 1119, 1205, 1237, 1574)

ECOLOGY AND PLANT GEOGRAPHY

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(See also in this issue Entries 791, 809, 812, 883, 1000, 1032, 1033, 1043, 1224, 1227, 1235, 1236, 1238, 1239, 1240, 1251, 1252, 1254, 1256, 1257, 1259, 1261, 1265, 1266, 1267, 1316, 1364, 1466, 1489, 1532, 1549, 1551, 1560)

GENERAL, FACTORS, MEASUREMENTS

931. DARWIN, F. A phænological study. New Phytol. 18: 287-298. 1919.—A record is given of the flowering dates of 259 of the commoner plants near Brookthorpe, Gloucestershire, England, for the years 1917, 1918, and 1919. Tables are also given of the mean weekly temperatures and of the deviations from the normal.—*I. F. Lewis.*

932. FRITSCH, F. E. Algal ecology. Freshwater and terrestrial forms. Jour. Ecol. 8: 68-76. 1920.—A review of recent contributions to the ecology of freshwater algae. Among the notable papers are those by MACCAUGHEY on Hawaiian forms (see Bot. Absts. 1, Entry 200), by TRANSEAU on *Spirogyra* hybrids (see Bot. Absts. 2, Entry 715), by ELMORE on the diatoms of Devil's Lake (see Bot. Absts. 2, Entry 10), and by CHODAT on some alpine species. Among the forms noted are *Oscillatoria*, *Coelastrum*, *Volvox*, *Euglena*, and *Hormidium*.—*Geo. D. Fuller.*

933. FRITSCH, F. E. Algal ecology. Marine forms. Jour. Ecol. 8: 66-68. 1920.—In a review of some of the recent contributions to the ecology of marine algae the principal points relate to the distribution of the Laminariaceae on the Pacific coast of North America and about the Orkney Islands. Some data by SAUVAGEAU (see Bot. Absts. 1, Entry 1585) on the distribution and naturalization of forms occurring in the southern portion of the Bay of Biscay are noted as well as an ecological discussion of the marine species of the Hawaiian Archipelago by MACCAUGHEY (see Bot. Absts. 1, Entry 200).—*Geo. D. Fuller.*

934. FULLER, GEORGE D. Vegetation of a glacial plunge basin. [Rev. of: PETRY, LOREN C. Studies of the vegetation of New York State. II. The vegetation of a glacial plunge basin and its relation to temperature. Bull. Torrey Bot. Club 45: 203-210. 1918 (see Bot. Absts. 1, Entry 835).] Bot. Gaz. 67: 184. 1919.

935. GAIN, EDMOND, ET ANDRE GAIN. Différences thermique de l'ubac à l'adret d'une vallée lacustre. [Temperature differences between the shaded slope and the sunny slope of a lacustrine valley.] Compt. Rend. Acad. Sci. Paris 170: 191-194. 1920.—The water of the lake is found at times to have a temperature at its surface of 4-6°C. higher than the soil on the adjacent slopes. The temperature of the soil at 1 dm. beneath the surface on the northern sunny slope is usually about 1°C. higher than that of the southern shaded slope. A like difference is found in the water of the streams entering the lake from the two slopes respectively.—C. H. and W. K. Farr.

936. GRAY, JOHN, AND GEORGE J. PEIRCE. The influence of light upon the action of stomata and its relation to the transpiration of certain grains. Amer. Jour. Bot. 6: 131-155. 18 fig. 1919.—See Bot. Absts. 3, Entry 436.

937. JOHNSTON, EARL S. Climatic conditions in a greenhouse as measured by plant growth. [The author's abstract of a paper read before the American Meteorological Society, April 22, 1920.] Monthly Weather Rev. 48: 215. 1920.

938. KEEN, B. A. Forecasting frosts. Nature 104: 450-451. 1920.—Review of observations by BOUSSINGAULT, HELLMAN, SCHUBERT, J. WARREN SMITH, HAZEN, O'GARA, and T. B. FRANKLIN. "Up to the present no complete correlation has been made of frost in any particular locality and its causes. For this purpose an examination by statistical methods of a series of continuous observations (of the automatic recording type) of meteorological factors is needed."—O. A. Stevens.

939. MICHAEL, ELLIS L. Marine ecology and the coefficient of association: a plea in behalf of quantitative biology. Jour. Ecol. 8: 54-59. 1920.—The writer examines the various formulae used for deriving the coefficients of association as applied to plankton studies and finds them all deficient. Emphasizing the importance of quantitative results he demands that proficiency in mathematics be regarded as a prerequisite for major work in biology.—Geo. D. Fuller.

940. SHULL, CHARLES A. Correlation of wind flow and temperature with evaporation. Plant World 22: 210-215. Fig. 1919.—Statistical study of the data obtained from evaporation station records from Lawrence, Kansas, shows that the correlation between air movement and evaporation is 0.29 ± 0.027 , and between temperature and evaporation the correlation is 0.687 ± 0.0156 .—Charles A. Shull.

STRUCTURE AND BEHAVIOR

941. CROCKER, WILLIAM. Buried weed seeds. [Rev. of: BRENCHLEY, WINIFRED E. Buried weed seeds. Jour. Agric. Sci. 9: 1-31. 1918 (see Bot. Absts. 2, Entry 615).] Bot. Gaz. 67: 515-516. 1919.—The reviewer regards the author's conclusions justified, but records her failure to note the very similar studies and conclusions of PETER, BEAL, and DUVEL.—H. C. Cowles.

942. CROCKER, WILLIAM. Osmotic pressure of epiphytes. [Rev. of: HARRIS, J. ARTHUR. On the osmotic concentration of the tissue fluids of phanerogamic epiphytes. Amer. Jour. Bot. 5: 490-506. 1918 (see Bot. Absts. 1, Entry 829; 8, Entry 944).] Bot. Gaz. 67: 520. 1919.

943. DOUGLASS, A. E. Climatic cycles and tree growth: a study of the annual rings of trees in relation to climate and solar activity. Carnegie Inst. Washington Publ. 289. 127 p., pl. 1-12, fig. 1-40. 1919.—Measurements and dates of formation of the annual rings of 230

trees, some over 2000 years old, were used as a basis for the study. Yellow pine (*Pinus ponderosa*) from Arizona and sequoia (*Sequoia gigantea*) from the Californian high Sierras furnished most of the specimens, although a considerable collection of chiefly Scotch pine (*Pinus silvestris*) with some spruce (*Picea excelsa*) was made in the Baltic drainage district of northern Europe, a smaller collection of hemlock (*Tsuga canadensis*) in Vermont, and another of Douglas fir (*Pseudotsuga mucronata*) in Oregon. Variations in the annual rings of individual trees, which in many cases were a number of miles apart, were often so uniform and characteristic that they permitted ready cross-identification. The fluctuations in growth reflected the sun-spot cycle or its multiples and the correlation with rainfall and temperature was shown to be close over the entire range of existing meteorological data. The correspondence of maxima and minima of these climatic variables with those of sun-spots indicates a physical connection between solar activity and terrestrial weather. Although the study of cycles is not considered complete the following conspicuous periods seem to be evident in the rates of growth: A half, a full, a double, a triple, and a triple triple sun-spot period—the sun-spot period being 10–13 years. Although these frequencies of maxima and minima in the growth curves are common to all the trees, the positions are sometimes regularly displaced, as, for example, in the Vermont trees in which the maximum growth regularly antedated the sun-spot maximum by about 3 years. In addition, the curves of tree growth exhibit a complex combination of short periods, including a prominent cycle of about 2 years; other persistent cycles recur in periods of 19, 14, 10, and 7 years. It was found that the trees' year begins in autumn and that double rings are indicative of spring drought. In dry climates the thickness of a ring is proportional to the rainfall with an accuracy of 70 per cent and a still closer correspondence may be expressed by an empirical formula that takes into account the distribution of the effect of rain over several adjoining years. For the discussion of curve-smoothing, identification of rings, dating of rings, curve standardization for the decreasing rate of growth with increasing age of trees, and the methods of tree selection the original must be consulted. An instrument (the automatic optical periodograph) was devised to reduce the influence of individual judgment in the determination of periodic changes in the growth rate. With it data may be examined for periodicity of any frequency and decisive conclusions drawn concerning changes in periods, recurrence of periods, and constancy of period length. Its description and directions for use cannot be abstracted.—H. E. Pulling.

944. FULLER, GEORGE D. Sap concentration in epiphytes. [Rev. of: (1) HARRIS, J. ARTHUR. On the osmotic concentration of the tissue fluids of desert Lorantheae. Mem. Torrey Bot. Club 17: 307–315. 1918 (see Bot. Absts. 1, Entry 684, 828). (2) HARRIS, J. ARTHUR. On the osmotic concentration of the tissue fluids of phanerogamic epiphytes. Amer. Jour. Bot. 5: 490–506. 1918 (see Bot. Absts. 1, Entry 829; 8, Entry 942).] Bot. Gaz. 67: 374–375. 1919.

945. GARDNER, MAX W. The mode of dissemination of fungus and bacterial diseases of plants. Rept. Michigan Acad. Sci. 20: 357–423. 1918.—See Bot. Absts. 3, Entry 764.

946. JONES, FRANK MORTON. Another pitcher-plant insect (Diptera, Sciarinae). Entomol. News 31: 91–94. 1920.—Description of a new fly, to which attention was first called in 1909 by MACFARLANE. Other flies found in pitchers of different species of *Sarracenia* are mentioned.—O. A. Stevens.

947. MILLER, DAVID. A new fungus-gnat which fertilizes *Corysanthes oblonga* Hook. New Zealand Jour. Sci. and Tech. 1: 4. 1918.—The gnat is *Ezechia thomsoni*.—H. C. Cowles.

948. UPHOF, J. C. TH. Cold-resistance as an ecological factor in the geographical distribution of cacti. Jour. Ecol. 8: 41–53. Pl., 6 fig. 1920.—From observations in the desert regions of Arizona and from experiments in the laboratory the conclusion is reached that the protoplasm of different species offers different degrees of resistance to low temperature and that this resistance is a hereditary physiological characteristic of the species. The temperature which damages a plant will kill it if continued long enough.—Some species have a rela-

tively thick integument which is somewhat resistant to low temperatures of short duration such as are common in the Arizona and adjacent deserts. A large range of resistance was found in different species.—*Geo. D. Fuller.*

949. WYLIE, R. B. Trimorphism of *Pontederia*. [Rev. of: HAZEN, TRACY E. The trimorphism and insect visitors of *Pontederia*. Mem. Torrey Bot. Club 17: 459-484. 1918 (see Bot. Absts. 1, Entry 830).] Bot. Gaz. 67: 271-272. 1919.

VEGETATION

950. FULLER, GEORGE D. Distribution of *Pinus Banksiana* and *Thuja occidentalis*. [Rev. of: FERNALD, M. L. Lithological factors limiting the ranges of *Pinus Banksiana* and *Thuja occidentalis*. *Rhodora* 21: 41-67. 1919 (see Bot. Absts. 4, Entry 283).] Bot. Gaz. 68: 149-150. 1919.—The reviewer feels that the author has criticized somewhat too severely HUTCHINSON's theory as to the cause of the distribution of these two trees (see Bot. Absts. 4, Entry 190). It is felt that there is truth in both theories, and that they are not necessarily nharmonious with one another.—*H. C. Cowles.*

951. FULLER, GEORGE D. Vegetation of Cape Breton. [Rev. of: NICHOLS, GEORGE E. The vegetation of northern Cape Breton Island, Nova Scotia. Trans. Connecticut Acad. Arts and Sci. 22: 249-467. 70 fig. 1918 (see Bot. Absts. 1, Entry 833).] Bot. Gaz. 67: 370-373. 1919.—"In its comprehensive character, its abundance of detail, and its notable contributions to various phases of ecology, including the relationships between deciduous and coniferous forests, the ecology of the sphagnum and of the development of raised bogs, this report stands as one of the most notable of recent years."—*H. C. Cowles.*

952. FULLER, GEORGE D. Heath and grassland. [Rev. of: FARROW, E. P. On the ecology of the vegetation of Breckland. III. General effects of rabbits on the vegetation. IV. Experiments mainly relating to the available water supply. V. Observations relating to competition between plants. VI. Characteristic bare areas and sand hummocks. Jour. Ecol. 5: 1-18, 104-112, 155-172. 1917; 6: 144-152. 1918 (see Bot. Absts. 1, Entry 824).] Bot. Gaz. 67: 181-182. 1919.

953. HAUMAN, LUCIEN. La végétation des hautes Cordilleres de Mendoza (République Argentine). [The vegetation of the high Cordilleras of Mendoza.] An. Soc. Cien. Argentina 86: 121-188, 225-348. 21 pl., 7 fig. 1918.—This article gives a rather detailed description of a scanty alpine vegetation found on the high Andes between 31 and 37°S. latitude at elevations from 2000 to 4200 meters. This region possesses many peaks exceeding 6000 m., the highest and best known being Aconcagua with an altitude of 7020 m. These are snow capped and possess a good development of glaciers, from which flow tortuous and variable streams. These furnish almost the entire water supply for the sparse vegetation as the growing season in these mountains is almost entirely without rain. The temperature records are imperfect but an important factor is seen in the light frosts which are common throughout the growing season. One station at 2700 m. gives an annual mean temperature of 6.5°C., with mean maximum of 13.4°C., and a mean minimum of 0.1°C. Humidity is at all times low while wind velocity is decidedly high and constant. Precipitation as recorded at 2000 m. seems to be irregular and variable, the annual amounts ranging from 20 to 69 cm., occurring principally in the colder months in the form of snow. This deficiency of rainfall combined with other factors makes the vegetation not only very scanty but limited to valleys and slopes which possess streams or seepage water from the glaciers and snowfields. In the absence of mountain lakes aquatic vegetation is scanty and anything like mountain meadows are limited to the stream edges and small alluvial fans. Such grassy associations appear to closely resemble similar alpine areas elsewhere. Related to the alpine meadows are the "high Andean oases" formed at 3200-3600 m. where at the foot of talus or moraine slopes some alluvial soil has accumulated. These oases vary in size but rarely reach 100 m. in diameter. They are often dominated by the

juncaceous *Andesia bisexualis* 15 to 30 cm. high forming a thick carpet.—Trees are absent throughout, and even in the valleys the shrubs do not exceed 2 m. in height. *Adesmia pini-folia*, a legume, is the most plentiful shrub, while among the others are *Ephedra americana andina*, *Berberis empetrifolia*, and *Senecio usspallatensis*. *Opuntia andicola*, the only cactus of the region, together with *Azorella Gilliesii* and *Laretia acaulis*, 2 umbellifers, form a curious trio of herbaceous cushion plants confined to the valleys.—Upon the more exposed parts of the mountains there is a notable abundance of prostrate, tufted, rosette and cushion plants often with a striking development of large woody roots. These growth-forms are accounted for as being in response to exposure to high winds and dependence upon a subterranean water supply. Upon the slopes *Adesmia triguga*, with shrubby cushions 30 cm. high, together with *Poa chilensis* and *Stipa speciosa* in tufts, dominate the area, forming scattered dots over the rocky landscape. Most abundant upon the summits between 3000 and 4000 m. are the subterranean woody cushions of *Adesmia subterranea*, whose leaves form a carpet upon the surface. Accompanying this species with similar growth-forms are the more uncommon *Verbena uniflora* and *Oxalis bryoides*.—The entire vascular flora consists of 417 species, including 1 pteridophyte, *Cystopteris fragilis*, and one gymnosperm, *Ephedra*. Among the best represented families are Compositae with 85 species, Leguminosae with 36, Gramineae with 34, Cruciferae with 28, Portulacaceae with 15, Umbelliferae with 15, Rosaceae with 12, Cyperaceae with 12, Oxalidaceae with 10, and Violaceae and Caryophyllaceae with 9 species each. Well represented genera are *Senecio* with 26 species, *Adesmia* with 16, *Calandrinia* with 15, *Astragalus* with 12, *Oxalis* with 10, and *Viola* with 9. The scarcity of the Saxifragaceae, with 2 rare species, and the entire absence of the Ericaceae and Primulaceae, are worthy of note. Lichens, abundant at the lower altitudes, become very rare above 2800 m., mosses are common about springs up to 3600 m. but liverworts are entirely lacking. More than one-half the species (210) are classed as belonging to the central Andes, 60 being endemic. There are no endemic genera but notable among this group are such aggregates as 6 species of *Adesmia*, 2 of *Boopis*, 12 of *Senecio*, and 2 new varieties of *Koeleria*. The other elements are the northern tropical with 16 species, the subtropical with 21 species, the basal Argentinian with 56 species, the southern Andean with 10 species, the Patagonian with 73 species, and the cosmopolitan and introduced species numbering respectively 28 and 17. This introduced element must be regarded as small when it is recalled that the Mendoza River valley has been the trans-Andean route for centuries.—There is a carefully and fully annotated list of the vascular flora of the regions based on the collections of the author and those of other explorers, and finally there is a bibliography of 54 titles.—Photographs and drawings illustrate many of the less known species.—Geo. D. Fuller.

954. RÜBEL, EDUARD. Über die Entwicklung der Gesellschaftsmorphologie. [The evolution of the morphology of plant communities.] Jour. Ecol. 8: 18–40. 1920. The author gives an outline of the history of statistical investigations of vegetation from Humboldt (1807) to the present, tracing an evolution in the study of the forms of plant communities, and treating the work of nearly 30 different workers in some 24 pages.—In different plant communities quantitative results have been sought for such matters as abundance, dominance and its sub-classes, manner of occurrence (gregarious, solitary, etc.), frequency, life-forms (growth-forms) and layers, specificity of species to associations ("Gesellschaftstreue"). The aim is the quantitative expression of relations obtaining in such communities for the investigation of associations and succession and for the purposes of plant geography. The varying forms of associations are well characterized by these results. There is no finality in any method or combinations of methods. The future will undoubtedly show greater advances. The author emphasizes the need for the study of forms in distinction from their ecology. He states that hitherto the work has been too largely concerned with the ecology of plant communities and that it should be more concerned with the morphology of plant communities in order that the results obtained may be applied in the elucidation of successions.—The paper brings into view, in its sketch of the evolution of statistical methods for over a century of activity, that the quantitative results so far reached are sometimes really quantitative only in the sense of being numerical description.—H. de Forest.

955. SALISBURY, E. J. A draft scheme for the representation of British vegetation in black and white. Jour. Ecol. 8: 60-61. Pl. 1920.—The various types of vegetation are represented by rather simple symbols.—Geo. D. Fuller.

956. SHREEVE, FORREST. Vegetation of Washington and Idaho. [Rev. of: WEAVER, J. E. A study of the vegetation of Southeastern Washington and adjacent Idaho. Univ. Nebraska Studies 17: 1-114. 48 fig. 1917.] Plant World 22: 216-217. 1919.

FLORISTICS

957. ANDERSON, J. P. Plants of southeastern Alaska. Proc. Iowa Acad. Sci. 25: 427-449. 1920.—A catalogue of pteridophytes and spermatophytes collected mostly at Sitka and Juneau. Habitat and abundance are noted.—H. S. Conard.

958. ANDREWS, A. LEROY. Bryological notes. V. *Scapania nimbosa* from Norway. Torreyia 19: 49-51. 1919.—See Bot. Absts. 3, Entry 699.

959. ANONYMOUS. Geography of U. S. botanical drugs. Pharm. Era 52: 63-66, 89-92. 9 fig., 2 maps. 1919.—See Bot. Absts. 3, Entry 424.

960. ARBER, AGNES. Aquatic angiosperms: the significance of their systematic distribution. Jour. Botany 57: 83-86. 1919.—See Bot. Absts. 3, Entry 733.

961. CLUTE, WILLARD N. Rarity of *Conopholis*. Amer. Bot. 25: 108. 1919.—*Conopholis americana* is regarded as very rare in most of its range. At Saeger's Lake, Valparaiso, Indiana, several acres thickly strewn with this plant were noted in 1919.—W. N. Clute.

962. DEANE, WALTER. *Amsinckia* in New England. Rhodora 21: 38-40. 1919.—An account of the occurrence of the genus in New England.—James P. Poole.

963. FULLER, GEORGE D. Vegetation of Newfoundland. [Rev. of: FERNALD, M. L. The contrast in the floras of eastern and western Newfoundland. Amer. Jour. Bot. 5: 237-247. 3 pl. 1918 (see Bot. Absts. 1, Entry 469).] Bot. Gaz. 67: 101. 1919.

964. GERSTLAUER, L. Neue Arten und Standorte der Flora von Augsburg und Mittelschwaben. [Species and stations new to the flora of Augsburg and Middle Swabia.] Ber. Naturw. Verein. Schwaben u. Neuburg 42: 251-263. 1919.—This article is a continuation of earlier articles published in the same transactions. The author lists 10 pteridophytes and 161 spermatophytes from the region indicated, giving in each case one or more definite stations with the names of the collectors. Eighteen species and 14 hybrids are reported for the first time. At the close of the paper, certain records in Weinhart and Lutzenberger's "Flora von Augsburg" are corrected.—A. W. Evans.

965. GLEASON, H. A. *Rhamnus dahurica* in Michigan. Torreyia 19: 141-142. 1919.—Two wild trees of this species have been found in a swamp south of Ann Arbor, Michigan, 500 yards or more from any residence. Only 1 cultivated tree of the species is known in the vicinity, and as it is smaller it cannot be the parent of the wild trees.—J. C. Nelson.

966. HARPER, ROLAND M. *Tumion taxifolium* in Georgia. Torreyia 19: 119-122. 1919.—*Tumion taxifolium* (Arn.) Greene, the "savin" or "stinking cedar," which has heretofore been known as occurring only in Gadsden and Liberty counties, Florida, was collected by the author in Decatur County, Georgia, on August 16, 1918, in a ravine about 100 yards north of the State line at Chattahoochee, Florida. Several trees were found, some a foot in diameter and 40 feet tall.—J. C. Nelson.

967. KIDDER, NATHANIEL T. *Solidago lepida*, var. *fallax* in Knox County, Maine. Rhodora 22: 77-78. 1920.—An account of the discovery of *Solidago lepida* DC. var. *fallax* Fernald on Nathan's Island, one of the outermost islands of Penobscot Bay, lying about 15 miles

southwest of Mt. Desert. The determination was made at the Gray Herbarium by Professor Fernald. The range of this variety as previously published has been Newfoundland to British Columbia, south to northern New Brunswick, northern Maine, northern Michigan, Utah, and Washington. This new station is the first south of Aroostook Valley.—*James P. Poole.*

968. KNOWLTON, C. H., W. S. RIPLEY, JR., AND C. A. WEATHERBY. Second report of the Committee on Floral Areas. *Rhodora* 22: 80–89. 1920.—This report covers the Polypodiaceae, Schizaeaceae, and Osmundaceae and is published as a part of the "Preliminary Lists of New England Plants." In addition to giving the distribution of the plants by states, the article gives considerable information as to their distribution according to ecological and soil classifications.—*James P. Poole.*

969. LONG, BAYARD. Regarding *Gentiana Andrewsii* in the coastal plain of New Jersey. *Rhodora* 22: 104–110. 1920.—The author finds that earlier records of the occurrence of this species in the region referred to were apparently due to errors in the determination of species and that in reality it is one of the rarest of plants in the Coastal Plain region. The evidence also seems to lead to the logical conclusion that the few stations reported within the region are extensions of the Piedmont region.—*James P. Poole.*

970. LONG, C. A. E. Some noteworthy *Matinicus* plants. *Rhodora* 22: 110–111. 1920.—A list of some of the more interesting plants found growing on the island of *Matinicus* by the author.—*James P. Poole.*

971. MÖRNER, CARL TH. Botaniska anteckningar från Norrlands-färder 1916–1919. [Notes from journeys in Norrland (northern Sweden) 1916–1919.] *Bot. Notiser* 1920: 33–40. 1920.—The author gives the localities for 37 species, together with geographic and ecological notes concerning them.—*P. A. Rydberg.*

972. MOUSLEY, H. Further notes on the orchids of Hatley, Stanstead County, Quebec, 1919. *Canadian Field-Nat.* 34: 44–47. 1920.—The habit and habitat of 12 species of orchids are presented. In all, 30 species of orchids were found within an area of 4 square miles.—*W. H. Emig.*

973. NELSON, JAMES C. Additions to the flora of western Oregon during 1919. *Torreyia* 20: 37–45. 1920.—Indigenous species not mentioned in Piper & Beattie's *Flora of the Northwest Coast* are found within the limits of that manual in 3 regions of western Oregon: (1) Along the Calapooia Range, (2) along the Cascades in the Mt. Jefferson region, and (3) along the lower course of the Columbia. In addition to these, the number of naturalized exotic species is constantly increasing. A list is given of 90 species collected in western Oregon during the season of 1919, none of which is mentioned in the *Flora of the Northwest Coast*; 54 of these are foreign. Of the indigenous species, 7 are from the Calapooias, 12 from Mt. Jefferson, and 5 from the lower Columbia. To the 1617 species of the *Flora of the Northwest Coast*, 309 have now been added. Previous lists have appeared in *Torreyia* 18: 21–35, 220–226.—*J. C. Nelson.*

974. PERSSON, JOHN. Till Brobytraktens flora. [Additions to the flora of the Broby region, Sweden.] *Bot. Notiser* 1920: 101–102. 1920.—The author notes 23 additions of phanerogams and mosses since the second edition of Areschoug's *Flora*. The greatest rarity of the region, *Orchis latifolia*, has disappeared, and a few others may be hard to rediscover.—*P. A. Rydberg.*

975. POOL, RAYMOND J. Pin oak in Nebraska. *Torreyia* 20: 50–52. 1920.—*Quercus palustris* Du Roi was collected by Thomas D. Howe near Table Rock, Pawnee County, Nebraska, in September, 1919, evidently native. This is the first recorded occurrence in the State. Eleven species of *Quercus* are now known to occur in Nebraska.—*J. C. Nelson.*

976. RÖLL, J. Über *Sphagnum riparium* Ang. und über seine Verbreitung im hercynischen Florengbiet. [Concerning *Sphagnum riparium* and its distribution in the Hercynic Flora.] *Hedwigia* 61: 176-182. 1919.—The stations for *Sphagnum riparium* in the Hercynic flora are recorded, together with notes on ecological factors. Apparently there are many ecological variations. In dry localities the moss is only a few centimeters high; leaves and branches are very crowded. The stem leaves vary very little but the branch leaves assume various forms, depending on the location.—*Ernst Artschwager*.

977. SAMUELSSON, GUNNAR. Anteckningar från Torneträsk-området. [Notes from the region of Torneträsk (a lake in Lappland, Sweden).] *Bot. Notiser* 1920: 51-61. 1920.—The author gives a general description of the arctic-alpine vegetation, gives lists of plants of 3 different formations, and a list of localities of nearly 150 species which had been found at altitudes not strictly belonging to their altitudinal ranges.—*P. A. Rydberg*.

978. STANDLEY, PAUL C. *Stachys lanata* in Ontario. *Rhodora* 22: 128. 1920.—The author reports the occurrence of this species near Owen Sound, Ontario. Although the literature has not been searched thoroughly he thinks that perhaps this plant, which is native of the Caucasus region, has not been reported previously from North America.—*James P. Poole*.

979. STEVENS, O. A. The geographical distribution of North Dakota plants. *Amer. Jour. Bot.* 7: 231-242. 1 fig. 1920.—The vascular plants of the North Dakota flora may be divided into 6 main groups: (1) Those which are essentially eastern in their distribution and reach only the eastern part of the state; (2) those which are eastern but extend to the western part of the state; (3) those which are essentially western and reach only the western part of the state; (4) those which are western but extend to the eastern part of the state; (5) cosmopolitan plants; and (6) introduced plants. Characteristic members of these groups are enumerated and discussed.—The state lies almost wholly within the Transition life zone. The few members of its flora which belong to the Canadian zone or to the Upper Austral zone are enumerated. The plants which are common to North Dakota and to New Mexico are studied as to their comparative distribution in the 2 states with reference to life zones.—Some sand dune species, some introduced ones, and certain others of particular interest are discussed.—*E. W. Sinnott*.

980. THOMPSON, H. STUART. Habitats of *Hypericum humifusum*. *Jour. Botany* 57: 195-196, 225-226. 1919.—This plant was found in the turf of woodland paths over limestone in northern Somerset County. In most of the texts it is said to occur in places which would indicate a gravelly, sandy, or heathy acid soil. A later observation has shown the plant chiefly confined in Cornwall and Devonshire to mossy crevices in stone walls and dry hedge banks by roadsides on granite and slate. It was found only twice on heaths or commons. One or two plants only occur in a place. The author believes that the distribution has been much influenced by man. Brief notes on the soil preference of *Juncus tenuis* and *Erodium maritimum* are given.—*K. M. Wiegand*.

981. THOMSON, GEO. M. Naturalization of animals and plants. *New Zealand Jour. Sci. and Tech.* 1: 192. 1918.

982. VOGG, L. Aussterbende Pflanzen. [Plants becoming extinct.] *Ber. Naturw. Verein Schwaben u. Neuburg* 42: 184-186. 1919.—Attention is called to the threatened disappearance of certain species in the vicinity of Kutzenhausen, Bavaria, owing to the spread of cultivation. A few of the species listed grow on a railway embankment, a few others are found in a moist forest meadow, but the majority are inhabitants of boggy meadows. In addition to the plants on the eve of extinction the accompanying species are likewise enumerated.—*A. W. Evans*.

983. WOODRUFFE-PEACOCK, E. A. *Hypericum humifusum*. Jour. Botany 57: 225. 1919.—Notes called forth by H. STUART THOMPSON's article in this journal (see Bot. Absts. 8, Entry 980). The author makes use of 50 years of very carefully kept soil records for Lincolnshire. He shows the percentage distribution of this *Hypericum* in the different soils. It is calciphobe, and typically a plant of the open woodland of the older decaying stages passing into calluna moorland. In general the observations bear out those of Thompson and BENTHAM.—K. M. Wiegand.

984. ZINSMEISTER, J. B. Weitere Beiträge zur Flora von Augsburg und Schwaben. [Further contributions to the flora of Augsburg and Swabia.] Ber. Naturw. Verein Schwaben u. Neuburg 42: 264-270. 1919.—The author lists 4 pteridophytes and 122 spermatophytes from the region in question, giving one or more definite stations in each case. A hybrid origin is indicated in 18 instances.—A. W. Evans.

APPLIED ECOLOGY

985. MUNNS, E. N. Some biological and economic aspects of chaparral. Jour. Forestry 17: 9-14. 1919.—See Bot. Absts. 1, Entry 1147; 3, Entry 560.

986. TOUMEY, J. W. The relation of gray birch to the regeneration of white pine. Jour. Forestry 17: 15-20. 1919.—See Bot. Absts. 3, Entry 578.

FOREST BOTANY AND FORESTRY

RAPHAEL ZON, *Editor*

J. V. HOFMANN, *Assistant Editor*

(See also in this issue Entries 768, 864, 1129, 1176, 1206, 1351, 1365, 1368, 1374, 1382, 1390, 1392, 1395, 1397, 1402, 1406, 1408, 1414, 1423, 1435, 1468, 1492, 1540, 1549, 1560, 1565)

987. ANDERSON, J. Paper from Alaska. Sci. Amer. 124: 64, 75. 3 fig. 1921.—A popular article considering the supply of pulpwood in Alaska. It is stated that the National Forests of Alaska contain resources sufficient to produce 1,500,000 tons of paper annually in perpetuity.—Chas. H. Otis.

988. ANONYMOUS. El algarroba. [The carob bean.] Informacion Agric. [Madrid] 10: 501-504. 6 fig. 1920.

989. ANONYMOUS. Grundbesitz und Vermögensabgabe in Oesterreich. [Landed estates and property taxes in Austria.] Allg. Forst- u. Jagdzeitg. 38: 61-62. 1920.—A discussion of the tax law under consideration by the Ministry of Finance. Assessments on forest estates will be upon their vastly inflated present sale value, as they fall into the classification of "large estates." Medium and small estates have a lower valuation based on pre-war values. The result will be discouraging to Austrian forestry and threatens to cause the breaking up of many large forest estates and demoralization of the lumber trade.—F. S. Baker.

990. ANONYMOUS. Mitteilungen über die Ergebnisse der Sächsischen Staatsforstverwaltung im Jahre 1918. [Administration report of state forests of Saxony for 1918.] Tharander Forst. Jahrb. 71: 264-268. 1920.—Classified tables of areas, income, and expenditures are given. The total forest area of the state forests of Saxony at the end of 1918 was 180,989 hectares, of which 172,934 hectares is forest land and 8,055 hectares non-forest land. This is an increase of only 49 hectares over 1917. The income from the state forests was 31,393,339 marks—an increase of 5,057,450 marks over 1917. The increase in income was partly due to the rising price of wood. The price per festmeter of fuelwood increased from 21.72 marks in 1913 and 27.37 marks in 1916 to 44.37 marks in 1918. The total income of the department of forestry was 32,431,903 marks—an increase of 5,228,776 marks over 1917. This is an

average income per hectare of 179.19 marks. The total expenditures, excepting the cost of the forest working plan station, was 11,367,764 marks—an increase of 3,697,011 marks over 1917. The expenditures averaged 62.81 marks per acre of forest land, that is, only 35.1 per cent of the total income.—*Joseph S. Illick.*

991. ANONYMOUS. Die Nachzucht des Vogelbeerbaumes und der Alpenerle. [Reproduction of mountain ash and alpine alder.] Schweiz. Zeitschr. Forstw. 71: 372-376. 3 pl. 1920.—A résumé of M. DECOPPET's paper read at the meeting of foresters. The mountain ash (*Sorbus aucuparia* L.) and the alpine alder (*Alnus viridis* DC.) occur throughout the forests of Switzerland from the lowest elevation to timber line. The mountain ash is especially adapted to the steep hillsides, due to its resistance to snow break. It sprouts prolifically when the main stem is broken, and grows rapidly. Reseeding is rather slow, and experiments have shown that seed should be secured from localities with similar growing conditions. The same applies to the alders.—*J. B. Hofmann.*

992. ANONYMOUS. Oesterreichs Holzmarktlage. [Austrian timber market conditions.] Allg. Forst- u. Jagdzeitg. 38: 74-75. 1920.—The timber market is in a demoralized condition. Prices are unreasonably high but indications are that the peak is not reached. Prices for different grades of lumber and round wood for the first week of March, 1920, are given.—*F. S. Baker.*

993. ANONYMOUS. Schluss der "wilden" Holzschlägerungen im Wienerwalde. [End of the "wild" cutting in the Vienna forest.] Allg. Forst- u. Jagdzeitg. 38: 69. 1920.—On account of the fire wood famine in Vienna in the winter of 1919, unregulated cutting was allowed in the Vienna forest, in which a great part of the forest was ruthlessly destroyed.—*F. S. Baker.*

994. ANONYMOUS. The tragedy of our American forests. Sci. Amer. 123: 540. 1920.

995. ANONYMOUS. Was ist Eichengerbholz? [What is oak tanning wood?] Allg. Forst- u. Jagdzeitg. 38: 63. 1920.—Oak for tanning extract is in high demand in Germany on account of the impossibility of importing foreign sources of extract due to the abnormally high price. Wood is accepted as small as 12 cm. at the small end and $\frac{3}{4}$ to 1 $\frac{1}{2}$ meters long. Both heart and sapwood must be generally sound. The wood is bought by weight and will bring 7.5 marks per centner delivered on board cars or ships. Farmers are urged to clear lands covered with small crooked oaks that have been hitherto unmerchantable.—*F. S. Baker.*

996. ANONYMOUS. Die Vergrößerung der italienischen Staatsforste. [The expansion of Italy's state forests.] Allg. Forst- u. Jagdzeitg. 38: 68. 1920.—A short news item. The extension of the Italian boundaries, according to the treaty of St. Germain, gives Italy important forests between the Julian Alps and Carniola. The state forest of Tarvis contained 12,000 hectares of forest, 1000 of pasture, and 10,000 of stony land unfit for agriculture; 1800 cubic meters per hectare is the average annual production.—*F. S. Baker.*

997. ANONYMOUS. Zu den geplanten Steuermassnahmen in Oesterreich. [Regarding the plans for tax assessment in Austria.] Allg. Forst- u. Jagdzeitg. 38: 73-74. 1920.—The increased taxes on land values threaten to cause the burdening of large forest holdings with intolerable mortgages or to force their sale to the state. The land tax is increased from 25 to 40 per cent of the official net income (including the tax remissions on account of damage to the property by the elements). There is furthermore a surtax on a sliding scale depending upon the value of the property as well as the enhancement of its value during the past year. Also, a "trade tax" of 1 $\frac{1}{2}$ per cent is levied on all commercial transactions, but does not apply to wood cut by the owner for his own use.—*F. S. Baker.*

998. ANONYMOUS. [Rev. of: BROWN, N. C. Forest products, their manufacture and use. xix + 471 p. John Wiley & Sons, New York, Chapman & Hall, London, 1919.] Sci. Prog. [London] 15: 320. 1920.

999. ANONYMOUS. [Rev. of: HENRY, A. Forests, woods, and trees in relation to hygiene. xii + 214 p., 28 illus., 21 maps and plans. Constable & Co.: London, 1919.] Sci. Prog. 15: 145-146. 1920.

1000. BALSEMAO, E. DE. Influencia das florestas na atmosfera. [Influence of the forests on the atmosphere.] Bul. Agric. Nova Goa [Portuguese East India] 1: 152-157. 1919.—Reprint of an article from Official Bull. of Portuguese India for 1883, and based on an article in Revue des Deux Mondes.—J. A. Stevenson.

1001. BARBOUR, W. R. Argentine and Paraguay forest conditions. Jour. Forestry 18: 823-830. 1920.—A brief description is given of the condition of the forest in Argentina and Paraguay with some of the uses of the principal woods. The most important forest industry of the region is the production of tannin from quebracho. Very little is being done for the extension or practice of forestry, planting being mostly confined to the landscape garden and windbreaks.—E. N. Munns.

1002. BERGER, HANS. Die Carl Heyersche Formel. [Carl Heyer's formula.] Schweiz. Zeitschr. Forstw. 71: 290-296. 1 pl. 1920.—The author points out the discrepancy in Heuer's formula when applied to other than normal and mature forests. The use of the average increment based on yield at time of cutting distributes the increment over periods of growth that are not measurable on this basis. Comparisons with the Bade formula shows wide variations in a stand of 50 hectares 50 years old. The conclusion is reached that it would be advisable to manage the forests with the application of less formula and more common sense.—J. B. Hofmann.

1003. BERKHOUT, A. H. Das Messen der Bäume hinsichtlich ihres Zuwachses. [Growth measurements of trees.] Schweiz. Zeitschr. Forstw. 71: 377-379. 1920.—A formula is worked out on the basis of relation of diameter to cubic contents. Ten trees are selected in each type. One group is in small, one in medium, and one in large trees. The average diameter and cubic contents are obtained by careful measurement, and the average tree is used for stand to be studied. If desirable, the trees measured may be remeasured at any time and the annual or periodic increment may be obtained. It is recommended that the tree be climbed and measured.—J. B. Hofmann.

1004. BERKHOUT, A. H. Het meten der boomen in verband met hun aanwas. [The measurement of trees in connection with their growth.] Mededeel. Landbouwhoogeschool Wageningen 17: 109-225. Fig. 16. 1920.—It is desirable in measuring lumber for forest calculations that the laws of probability be more generally used. A great number of examples are given.—J. C. Th. Uphof.

1005. BOAS, I. H. Preservation of piling against marine borers. Australian Forest Jour. 3: 315-316. 1920.—The advantages of protection by impregnation with preservatives over protection by external coatings are discussed. The experience of American experts is also summarized.—C. F. Korstian.

1006. BOODT. De bebossching van Drente. [The forestation of Drente.] Tijdschr. Nederland Heidemaatschappij 32: 192-200. 1920.—The forestation of the province of Drente (Netherlands) is most difficult. On clay-loam soils (1) *Pinus laricio* var. *austriaca*, or (2) growing yellow lupines followed by *Picea excelsa*, are recommended. On the heather fields *Pinus sylvestris* with oak and *Picea excelsa* are advisable. The former will form the main growth whereas the latter and oak form the undergrowth.—J. C. Th. Uphof.

1007. BORGMANN. [Rev. of: ENDIES, M. Lehrbuch der Waldrechnung und Forststatik. (Text-book of forest valuation and statics.) Berlin, 1919.] Forst. Rundschau 21: 13. 1920.—A short general notice of the third edition noting a few additions and changes.—F. S. Baker.

1008. BORGMANN. [Rev. of: MARTIN, H. *Die forstliche Statik*. [Forest statics.] 2nd ed. Berlin, 1918.] *Forst. Rundschau* 21: 10-12. 1920.—A criticism of some of Martin's points of view is included.—*F. S. Baker*.

1009. BREWSTER, DONALD R. A plan for the advancement of forestry in Wisconsin. *Jour. Forestry* 18: 792-802. 1920.—The area of cut-over land in Wisconsin amounts to about three million acres. Much of this land is now idle and unproductive. The ordinary organization of the State Board of Forestry is not thought advisable and a conservation council is proposed consisting of small groups of men chosen from each congressional district. The financial support would be derived from contributions from interested parties or from assessments upon organizations. The principal lines of work of this council would be the prevention and control of fires, the expansion of state forests, the reform of tax laws, survey of timber resources, and the establishment of experiment stations to work out forest problems.—*E. N. Munns*.

1010. BREWSTER, DONALD R. A plan for combined insurance and fire protection. *Jour. Forestry* 18: 803-805. 1920.—A plan is outlined to make forest protection and insurance automatic and self-supporting, and at the same time increase the area of timber lands under forest management. All forest lands would be assessed a small amount per acre to cover the cost of this protection and insurance, with exemption to wood lots and isolated areas. Brush lands would be considered of sufficient value to warrant protection and insurance until they were placed in a productive position. The advantages claimed are that the property owner would feel he was getting protection as well as insurance, and the distribution of risk, if combined with the tax reform, would make the production of timber a safer and more attractive investment for the private owner.—*E. N. Munns*.

1011. BUTTRICK, P. L. American trees for forest planting in France. *Jour. Forestry* 18: 815-822. 1920.—A number of conifers and hardwoods are listed which have been proved of value in France for forest planting, together with a description of the sites and places where such trees would do best.—*E. N. Munns*.

1012. CHAPMAN, R. W. Physical properties of some South Australian-grown pines. *Trans. and Proc. Roy. Soc. South Australia* 40: 405-427. 1919.

1013. CHIDSEY, C. E. Knots and holes on forest trees. *Sci. Amer. Monthly* 2: 209-210. 5 fig. 1920.—Discussion of causes of the curious and varied formations of grain in timber.—*Chas. H. Otis*.

1014. DACY, G. H. Forewarnings about forest fires. *Sci. Amer.* 123: 495, 508. 2 fig. 1920.—Describes a mechanical display by the U. S. A. Forest Service which illustrates pictorially how forest fires originate.—*Chas. H. Otis*.

1015. DAHL, A. L. Winter fuel from our woodlands. *Sci. Amer.* 123: 495, 508. 2 fig. 1920.

1016. DALEY, JOHN E. Production and characteristics of Mitscherlich sulphite pulp. *Paper* 26²⁴: 17, 30. 1920.

1017. FRYER, C. P. Light burning in California forests. *Sci. Amer.* 123: 543. 1920.

1018. FULLER, GEORGE D. Forest products. [Rev. of: BROWN, N. C. *Forest products*. xix + 471 p., 120 fig. Wiley & Sons: New York, 1919.] *Bot. Gaz.* 68: 479-480. 1920.

1019. FULLER, GEORGE D. Economic woods. [Rev. of: RECORD, S. J. *Identification of the economic woods of the United States*. 157 p., 6 pl., 15 fig. Wiley & Sons: New York, 1919.] *Bot. Gaz.* 68: 480. 1919.

1020. GERRY, ELOISE. American storax production: results of different methods of tapping red gum trees. Jour. Forestry 19: 15-24. 1921.—Commercial storax used in pharmacy is obtained from the Orient. During the war extracts were made from the red gum (*Liquidambar styraciflua*). Experiments were carried out in Louisiana to determine the proper methods. Heaviest yields were obtained from trees with parallel horizontal scarification as against the vertical scarring or girdling. Tapping early in spring gave the heaviest yields. Some substance should be used to prevent the entrance of decay on the open wounds.—*E. N. Munns*.

1021. GERRY, ELOISE. Microscopy of pulpwoods. Paper 267: 19-40, 50. Pl. 1-8, fig. 1-5. 1920.—A complete description of the woods and wood fibers used in the manufacture of pulp, and keys for identifying the same.—*H. N. Lee*.

1022. HAWLEY, RALPH C. Forestry at Nehasane Park. Jour. Forestry 18: 681-692. 1920.—The cuttings in this park 20 years ago were the first made under the direction of a forester. A 2nd cut has been planned under the direction of a resident forester. In the 1st cutting the selection system was used, which has been shown to be inadvisable in this type of country. Markets now accept woods which formerly were discarded, and small sizes are as much in demand as the larger ones.—Two general types are recognized, the balsam swamp or softwood land, and the hardwood type. In these the percentage of dominants in the reproduction does not differ materially from that in the older stand. Criticisms of the more recent cuttings answered by the author are: Lack of a sustained annual yield basis; 2nd cut too heavy; too rigid a diameter limit applied; cuttings show lack of immediate supervision by a forester; spruce is not increasing; cull hardwoods remain on the ground; and the large burn is not being made productive. It is shown that the work has thus far been a credit to the forestry profession, though the forester in charge has failed to secure the establishment of a thrifty forest of young growth unhampered by heavy-foliaged hardwoods. The administration and improvements made on the property are excellent.—*E. N. Munns*.

1023. HEINICKE. Die Reinertragsübersichten der Sächs. Staatsforsten für das Jahr 1918. [Net yield of state forests of Saxony for 1918.] Tharander Forst. Jahrb. 71: 59-71. 1920.—A series of 11 tables giving a classified account of the receipts and expenditures during 1918 of the 110 state forests of Saxony; also a summary of receipts and expenditures by forest districts. The total receipts from the 110 state forests was 31,616,330 marks and the expenditures 7,530,860 marks, leaving a net yield of 24,085,470 marks. The total forest capital of the state forests of Saxony is placed at 448,151,700 marks.—*Joseph S. Illick*.

1024. JENTSCH. Die Stellung des Waldes und der Waldwirtschaft im Volksstaate mit besonderer Beziehung auf Sachsen. [Where forestry stands in Germany.] Tharander Forst. Jahrb. 71: 1-29. 1920.—The war made heavy demands upon the forests of Germany which will continue during the reconstruction period. Methods of handling and controlling forests will change in consequence of the war and the subsequent revolution. Important economic questions and policies are discussed, among them the socialization of forests, an embargo on timber, effect of rising prices of wood on forest management, and stronger control over privately-owned forests. Expropriation of private forests is not regarded as feasible, but stronger state control over privately-owned forest land is recommended. The latter is desirable especially in Saxony, where private forests are numerous, and only 173 out of a total of 67,030 private forest holdings exceed 250 acres in size.—*Joseph S. Illick*.

1025. KRAUCH, HERMANN. Alinement volume tables. Jour. Forestry 18: 831-832. 1 fig. 1920.—The method of preparing alinement volume charts and the use of a volume table prepared in this manner is described. Alinement charts make possible a rapid transcription of volume data with less chance for error.—*E. N. Munns*.

1026. KRESS, OTTO, C. J. HUMPHREY, AND C. AUDREY RICHARDS. Guarding against fungi in wood and wood pulp. Paper 261⁰⁻¹²: 13-15, 21-22, 23-25. 11 fig. 1920.—Characteristics and qualities of papers made from sound wood or wood pulp as compared with that from

decayed material are discussed, as well as methods of infection, differences in appearance of, effects of, and methods of controlling, molds and wood-destroying fungi.—*H. N. Lee.*

1027. MAHOOD, S. A., AND D. E. CABLE. Decay of woodpulp. Paper 25²⁴: 11–12. 1920.—A chemical investigation of sound and infected ground wood pulp.—*H. N. Lee.*

1028. MARTIN. Die Fortbildung des Sächsischen Forsteinrichtungsverfahrens. [Development of the Saxon method of forest organization.] *Tharander Forst. Jahrb.* 71: 30–57, 72–89. 1920.—The final 4 chapters of a serial on forest organization in Saxony. The results and conclusions of 100 years of consistent and continuous development along the same line of organization are set forth. The determination of felling and management methods are discussed under the following headings: Choice of species, stand establishment, stand form, stand development, stand improvement, and soil treatment. The theory and practice of forest rent is discussed. The need for revision and control of organization plans is emphasized, the importance of regulating the entire business of forest organization is set forth, and the desirability of an effective coördination of forest administration, silviculture, forest investigation, and forest organization is stressed.—*Joseph S. Illick.*

1029. MARTIN. Das Verhalten von Kiefern-Buchen-Mischbeständen in ökonomischer Hinsicht, mit besonderer Rücksicht auf die forstlichen Verhältnisse Sachsens. [Mixed stands of Scotch pine and beech in Saxony.] *Tharander Forst. Jahrb.* 71: 269–282. 1920. [To be continued.]—Data collected to date show that pure stands of Norway spruce surpassed mixed stands of beech and Scotch pine in volume and value production. There are other determining factors which should be considered. The author believes that there are numerous areas, aggregating a large acreage, between the good hard wood soil and the poor pine soil well adapted to the production of mixed stands of Scotch pine and beech.—*Joseph S. Illick.*

1030. MOUNT, H. A. In the modern sawmill. *Sci. Amer.* 123: 548, 557. 4 fig. 1920.—Machines and methods by which the cutting up of logs is put on a basis of extreme economy.—*Chas. H. Otis.*

1031. MUNGER, T. T. Second remeasurement of permanent sample plots of Douglas fir on the west slope of the Cascades in Oregon. *Jour. Forestry* 18: 833–836. 1920.—On sample plots in Douglas fir it is found that there has been a loss of 41 trees per acre in 10 years, with an increase in diameter for the stand of from 13.7 to 16.3 inches, the basal area increasing from 200 to 224 square feet. The annual increment in cubic feet has fallen from 188 in the 1st 5 years to 80 in the 2nd, or from 1259 board feet in the 1st to 828 in the 2nd 5 years. The average cubic-foot volume of the trees in 1910 was 45; in 1915, 54; and in 1920, 66.—*E. N. Munns.*

1032. MUNNS, E. N. Chaparral cover, run-off, and erosion. *Jour. Forestry* 18: 806–814. 1920.—A severe fire in 1919 destroyed some 150,000 acres of brush cover in southern California. Erosion was very severe following this fire and destroyed much of the engineering work designed to prevent floods. On eroded areas a small stand of annuals and perennials came up from dormant seeds, which were present in much greater numbers on unburned lands. The soil of slightly eroded areas contained seeds of almost as many species and individuals as did the soil in non-burned and non-eroded areas.—*E. N. Munns.*

1033. MUNNS, E. N. High temperatures and eucalyptus. *Jour. Forestry* 19: 25–33. 1921.—High temperatures in southern California caused “burning” of trees, due largely to extreme droughty conditions. The amount of injury depended upon the abundance of water or the character of the soil. Trees on loamy soils suffered least. *Eucalyptus rostrata* and *E. terreticornis* of all the planted eucalypts withstood the droughty conditions best.—*E. N. Munns.*

1034. PEARSON, G. A. Brush disposal in western yellow pine. *Jour. Forestry* 19: 36-38. 1921.—Studies have been made since 1908 on methods of brush disposal. Sheep damage is prevented by piling the brush and logs together, though heavy brush hinders germination because of depth of litter. With no grazing in such places the grass grows very heavily and root competition is very keen. Where the brush is piled and burned seedlings do best, but because of the succulent vegetation sheep damage is very severe. When protected from grazing growth is exceedingly rapid. Protection from wind and sun is favorable, but detrimental if at the expense of soil-moisture loss by competition with other plants. Under controlled grazing, piling and burning give best results but methods are insignificant when compared with grazing.—*E. N. Munns.*

1035. PELLETER, WALDEMAR. Wiederbesiedlung und Forstwirtschaft. [Colonization and forestry.] *Oesterreich. Forst- u. Jagdzeitg.* 38: 30-31. 1920.—Following the war there has been a strong movement in Austria back to the land, encouraged by colonization laws that tend to break up large estates. This movement is closely interrelated with forestry, since in many cases it will result in the clearing of forested lands for farms. Many such lands have been under cultivation in the past but have been abandoned after the fertility of the forest humus became exhausted. The lands have reverted to forest and have been bought up in large blocks and placed under forest management. This new movement will decrease the area of such forests and will break up their unity to such an extent that economical management and logging will be very difficult, if not impossible. The interests of forestry must be protected for the good of the state and in some places for the good of these colonization schemes themselves, as in certain valleys the existence of farms will depend upon the possibility of the owner finding an occupation to supplement his farming. A permanent forest industry alone can furnish this supplementary occupation.—*F. S. Baker.*

1036. PILlichODY, A. Ein Erlenkopfhholzbestand. [Alder coppice.] *Schweiz. Zeitschr. Forstw.* 71: 289-290. 1 pl. 1920.—Alder coppice is not as common as willow (*Salix alba*), especially in the Rhone River bottom. At Epende there are about 4 hectares with stumps 10 to 15 meters apart. The stumps are knotty, partly decayed, hollow, and up to .80 meter in diameter, 1.5-2 meters high, and 70-80 years old. This coppice is on a clay soil and is very productive. Each stump supports 6-8 prominent sprouts that provide fuel wood in 10-15 years. The yield averages 150 cubic meters with an annual increment of 10-12 cubic meters.—*J. V. Hofmann.*

1037. RECORD, S. J. From wood to cloth. *Sci. Amer.* 123: 591, 601-602. 4 fig. 1920.

1038. RILEY, SMITH. A national game policy. *Jour. Forestry* 18: 767-774. 1920.—A plea is made for the adoption of a national game policy which would call for adequate game protection in order not only to provide hunting but to provide material for active observations of the haunts and activities of wild animals generally.—*E. N. Munns.*

1039. RUBNER, K. Die waldbaulichen Folgerungen des Urwaldes. [The conclusions which forest culture derives from the virgin forest.] *Naturw. Zeitschr. Forst- u. Landw.* 18: 201-213. 1920.—It is shown that the cultural forest is not to be considered as primarily unnatural, as is often thought, and that the composition of the virgin forest is not what it is commonly supposed to be. The virgin forests may be pure or extremely mixed; the character is directly dependent upon the climatic and edaphic conditions, and the ability of the various species to adapt themselves. The virgin forest is not typically selection, but more nearly a shelterwood forest. Much is to be learned regarding the value of humus in reproduction, and it is not to be considered that natural regeneration under the virgin forest develops the ideal conditions. It is admitted that clear-cutting, with all its faults, has helped considerably to perpetuate the forests and the more valuable species in Germany.—*J. Roesser.*

1040. S., W. Waldschutz. [Forest protection.] *Oesterreich Forst- u. Jagdzeitg.* 38: 53-54. 1920.—A reply to an article of same title by H. SAMMEREYER (see Bot. Absts. 4,

Entry 463). A wave of forest destruction is at present sweeping over the entire world. This destruction threatens to make wildernesses of many regions as it has made a desert of the Sahara in the past, while it also tends to arrest the purification of the air, which is one of the functions of the forest. Present forest areas should not be reduced. In Austria the futility of clearing forest land for permanent agriculture is shown by the fact that many such lands have been cultivated in the past but have been allowed to revert to forest when the fertility of the forest humus was exhausted and the productivity fell too low for economical handling for agriculture. Grazing in forests is incompatible with silviculture and must be stopped. The first requisite in securing forest protection is a world-wide educational campaign through schools, clubs, the press, etc., to develop a deeper regard for the forests and secure a more general recognition of their economic indispensability in any progressive state.—*F. S. Baker.*

1041. SEIBERT, FLORENCE B., AND JESSIE E. MINOR. The differentiation of sulphite pulps. Paper 25²¹: 17-20. 7 fig. 1920.—A description of a method using a combination of malachite green and Congo red to show very accurately the presence or absence of lignocellulose.—*H. N. Lee.*

1042. SEILER, HANS. Die Holznot in Kärnten. [The wood famine in Carinthia.] Allg. Forst- u. Jagdzeitg. 38: 67-68. 1920.—The lack of firewood in the cities was particularly marked in Carinthia during the winter of 1919. This was due to many causes, the chief ones being general insufficiency of supplies of all kinds, the rising stumpage prices which have encouraged small owners to hold their timber, and the depletion of the war when great quantities of the most accessible fire-wood were cut to supply the army. Organization of wood producers and dealers, the construction of roads, tramways, etc., and purchase of forest land by municipalities, associations, and the like, is urged as the best means of escaping repetitions of such a famine.—*F. S. Baker.*

1043. TUBEUF, C. VON. Verschiedenes Verhalten gegen Windströmung. [Different responses to air currents.] Naturw. Zeitschr. Forst- u. Landw. 18: 186-187. 1920.—Tubeuf refers to an illustrated paper under this title in Schweiz. Zeitschr. Forstw. 71: 177-179. 1920 (see Bot. Absts. 7, Entry 813) by A. PILLICHODY. The photograph in the latter's paper shows a row of broad crowned Canadian poplars, which have grown up sloping in the direction of the valley wind, and a row of Italian pyramid poplars (evidently Lombardy poplars) which have grown straight, to all appearances unaffected by the wind-movement. The local custom of trimming, which leaves but a small broomlike crown on the latter, and a wide-spreading crown tip on the former, accentuates the different effects produced by the wind-movement. The two trees are briefly compared as to their cultural desirability.—*J. Roesser.*

1044. VIDAL, Y. L. Micrography of sycamore pulp. Paper 27³: 18-19. 1920. [Translation from La Papeterie 62: 434-439. Fig. 1. 1920.]—The yield of pulp and possibilities for paper making are discussed. The dimensions of the elements and the histology of the vessels are given in detail.—*H. N. Lee.*

1045. WATSON, RUSSELL. Forest descriptions on the forest survey of the Groton State Forest, Vermont. Jour. Forestry 19: 43-50. 1921.—On the Groton Forest greater detail was needed than was obtained by using the standard forest description forms. A detailed questionnaire was built up to give data on the stand and the characteristics of the area, noting the silvical conditions as to planting, thinning, and final cutting.—*E. N. Munn.*

1046. WEIDMAN, ROBERT H. The windfall problem in the Klamath region, Oregon. Jour. Forestry 18: 837-843. 1920.—Heavy windfall losses occur annually throughout the north Pacific Coast. It has been found that the windfall losses, on cut-over land especially, are heaviest during the first years following cutting; as the trees become wind-firm the losses gradually decrease. In the virgin forest the loss from year to year is more or less constant except for exceptional heavy winds occasioning very heavy losses at infrequent intervals. Apparently neither quality of tree nor of site enables the trees to withstand these storms; and trees of all crown characters appear to suffer equally.—*E. N. Munn.*

1047. WHITE, DAVID G. Standardization of lumber sizes and grades. Jour. Forestry 19: 34-35. 1921.—The American Lumber Congress is supporting a proposed change in the manufacture of lumber. At the present time there is no standardization of grades in woods or in building materials. It is proposed to reduce the number of grades of finish materials and to unify the nomenclature of defects in structural woods.—*E. N. Munns.*

1048. WICKENDEN, H. R. A sketch on Swedish forestry from an American standpoint. Jour. Forestry 18: 775-791. 1920.—A general description is given of the organization of the Swedish forest service with some of its regulations and forest practices. The general subject of forestry in Sweden is very similar to that in America, though the former country has proceeded much farther toward forest management. Rotation varies from 80 to 150 years, depending upon climatic conditions, with clear cutting usually employed, except upon special areas where protection is needed. In these situations a selection system is used. Thinnings are made frequently but up to the present have been very slight, the tendency being toward heavier thinnings, especially in the crown. Logging is done chiefly during times of snow and the hauling is done by sleighs. The average saw log is between 14 and 19 feet long and from 7 to 9 inches in diameter. The logs are taken from the mill and driven down streams, which have been very greatly improved. Forest planting is carried on extensively through sowing in seed spots. Local seed has been proved superior to foreign seed. The tendency generally is for a shorter rotation and for volume production rather than quality. A constant increase in the price of lumber is expected at the rate of 2 per cent a year.—*E. N. Munns.*

1049. WISLICENUS, H. VON. Das pflanzenchemische Institut der Sächsischen Forstakademie und forstlichen Versuchsanstalt zu Tharandt und die Pflege der Pflanzenchemie im allgemeinen, der stofflichen Holzforschung im besonderen. [Plant chemistry institute and forest experiment station at Tharandt, Saxony.] Tharander Forst. Jahrb. 71: 90-106. 1920.—An academic discussion of the place of plant chemistry in a forest school curriculum and a consideration of the distinct fields covered by industrial research institutes and laboratories connected with educational institutions. The urgent need for a fuller and better knowledge of the chemistry of forest products was brought to full light during the war. Forest products laboratories are a real and urgent need. Timber impregnation, seasoning of wood, and turpentine yield are among the problems considered.—*Joseph S. Illick.*

1050. WOODBRIDGE, R. G., JR. Nitrocellulose from wood pulp. Paper 267: 136-146. 1920.

1051. WOOLSEY, THEODORE S., JR. The development of a brush-disposal policy for the yellow pine forests of the southwest. Jour. Forestry 19: 39-42. 1921.—Notes are made on the brush-disposal policy in the southwest to the effect that brush burning is better than fire lines, which are generally impracticable as desired in the district. Where possible these lines should be located on ridges rather than in the canyons or on the slopes.—*E. N. Munns.*

GENETICS

G. H. SHULL, *Editor*

J. P. KELLY, *Assistant Editor*

(See also in this issue Entries 769, 789, 796, 808, 809, 815, 819, 896, 1137, 1141, 1145, 1161, 1209, 1212, 1322, 1388, 1574)

1052. ADKINSON, JUNE. The behavior of bronchial asthma as an inherited character. Genetics 5: 363-418. 39 fig. 1920.—In a study of 400 cases of bronchial asthma, author found that 48 per cent gave a history of the occurrence of the disease in other members of the family. Asthmatics found sensitive to the cutaneous tests, more frequently give a family history positive for asthma than do the patients found non-sensitive to the cutaneous tests, but such histories do not furnish conclusions as to the cause, severity, prognosis or treatment in any given case. The tendency to hay-fever, asthma or allied condition is transmitted,

not the condition itself.—Thirty-eight family histories are analyzed with a more or less complete record of 91 matings in which parents or offspring were asthmatic or had hay-fever. In 4 matings where both parents were asthmatic, there were 9 asthmatic offspring, and 1 normal who transmitted asthma. In 34 cases, with one parent asthmatic and the other normal, but with positive family history, there were 60 asthmatic offspring, and 67 normal. In 17 matings, with one parent asthmatic and the other normal, with negative family history, there were 60 normal offspring. Where both parents were normal in 32 cases, with positive family histories, theoretically $\frac{1}{4}$ would be asthmatic, and $\frac{3}{4}$ normal, but in this series there were 3 times as many asthmatics as normal, there being 45 asthmatics and 15 normal.—Upon this data the writer concludes that bronchial asthma is inherited as a Mendelian trait recessive to the normal condition. In those asthmatics with one parent asthmatic and the other apparently normal, it is necessary to assume that the latter is simplex. The appearance of asthma in direct line in succeeding generations can be explained only on the supposition that for each generation, in the mating of the asthmatic and the new strain, the latter, though apparently normal, must in every instance carry asthma in the simplex condition in the germ-plasm (heterozygous). Those asthmatics with negative history are explained as duplex in respect to the character, the tendency being transmitted through several generations by antecedents who were themselves simplex.—Robert A. Cooke.

1053. ALVERDES, FRIEDRICH. Über das Manifestwerden der ererbten Anlage einer Abnormität. [On the manifestation of a hereditary primordium of an abnormality.] Biol. Zentralbl. 40: 473–480. 1920.—Abnormalities in structure of rudimentary 5th and 6th pairs of legs occurred (mostly in male individuals) in 1 pure line of *Cyclops viridis* but not in the control line, or, with one exception, in wild stock. Inheritance of abnormality is quite irregular. Sometimes normal parents produce abnormals, and abnormal parents frequently produce very few abnormals. Percentage of abnormals is always fairly low. Abnormality is very variable in its character; it is frequently marked on one side of an individual while other side is entirely normal. Author attributes results to inheritance of a more than normal lability of the *primordium* of the 5th and 6th pairs of legs.—A. M. Banta.

1054. ANCEL, P. Sur l'hermaphrodisme glandulaire. [On glandular hermaphroditism.] Compt. Rend. Soc. Biol. 83: 1642–1644. 1920.—Six pigs studied were hermaphrodite in that both glands were mixed, or one was true ovary, other was mixed or a testis. In mixed glands, the upper part was testicular, the lower ovarian. Wolffian duct persisted only on side where there was a testis or mixed gland. Uterus was well developed in all of them, but Fallopian tube was well developed only on side next to true ovary. Observations are held to support view that genital glands are normally hermaphrodite, with only one part developed. Author believes persistence of Wolffian duct, often observed in female, is due to presence of hermaphrodite gland or testis.—A. Franklin Shull.

1055. ANONYMOUS. Berichtigung. [A correction.] Zeitschr. Indukt. Abstamm. u. Vererb. 20: 295. 1919.—In NACHSTEIN, N. Die Analyse der Ergfactoren bei *Drosophila* und deren zytologischen Grundlage. Zeitschr. Indukt. Abstamm.- u. Vererb. 20: 118–156. 1919, the labeling of figure 2, page 133, should be interchanged as follows: In the F_1 generation the word "rotäugig" should read "weissäugig" and in the F_2 generation the word "rotäugig" at the right should read "weissäugig."—J. L. Collins.

1056. ANONYMOUS. Better dairying by bull associations. Joint use of good sires improves herds. Jour. Heredity 10: 135. Mar., 1919.—A quotation from a News Letter of the U. S. Department of Agriculture. The advantage of coöperative bull associations are discussed briefly.—Sewall Wright.

1057. ANONYMOUS. Variation, selection and mutation in one of the protozoa. Jour. Heredity 10: 143. Mar., 1919.—Review of work of MIDDLETON and JENNINGS and of R. W. HEGNER, which indicates that heritably diverse strains may be selected out from a single vegetatively reproduced organism,—in this case *Arcella dentata*.—J. H. Beaumont.

1058. ANTHONY, R. D. Asexual inheritance in the violet (*Viola odorata*). New York Agric. Exp. Sta. [Geneva] Tech. Bull. 76. 55 p., charts 1-10. 1920.—A study was made of the possibility of changing, through a series of selections, stem length and yield of the double violet, Marie Louise (*Viola odorata*), in order to throw light on the problem of bud selection in pome fruits. Eight hundred plants of this variety, the previous histories of which were unknown, were used as parent plants. Selections were made from these for long stem high yield, long stem low yield, short stem high yield, and short stem low yield, each year. Methods of selecting, corrections for vigor, and corrections for variations due to positions in the house are considered in detail. At the end of 5 years 4 groups had been isolated. Yield for each group was as follows: Long stem high yield, 36.484 ± 0.505 ; long stem low yield, 34.637 ± 0.572 ; short stem high yield, 40.359 ± 0.569 ; short stem low yield, 35.389 ± 0.515 . Yield is expressed in number of normal flowers. Stem length in each group is as follows: Long stem high yield, 8.920 ± 0.029 ; short stem high yield, 8.537 ± 0.040 ; long stem low yield, 8.483 ± 0.043 ; short stem low yield, 8.537 ± 0.043 . The unit of length was the half inch. All of the plants in each of the 4 groups traced back to a single one of 4 of the original 800 plants. "It follows then that we seemingly have proved only the existence of asexually inherited differences which probably were present before the experiment was begun."—*W. D. Valleau*.

1059. BARKER, E. EUGENE. El mejoramiento de nuestras siembras por la selección. [The improvement of our crops by means of selection.] Estacion Exp. Insular Puerto Rico Circ. 30. 24 p. 1920.—Popular account. No new methods presented.—*E. E. Barker*.

1060. BONNET, L. O. Some observations concerning pollination of olives. Fig and Olive Jour. 4¹²: 4. 1920.—Author discusses a one-season study made 20 years ago at Pomona, which indicated that some olive varieties are fully self-fertile and others more or less self-sterile.—*Howard B. Frost*.

1061. BOULENGER, M. F. L'hérédité morbide. [Inheritance of disease.] Scalpel 73: 669-676. 1920.

1062. BOUMAN, K. HERMAN. Anthropologische Feststellungen über die Amsterdamer Schulbevölkerung. [Anthropological discoveries on the school population of Amsterdam.] Nederlandsch. Tijdschr. Geneesk. 64: 2374-2383. 1920.

1063. BRIDGES, CALVIN B. The developmental stages at which mutations occur in the germ tract. Proc. Soc. Exp. Biol. Med. 17: 1-2. 1919.—Study of critical cases among mutants and mosaics of *Drosophila melanogaster* has shown that mutation occurred (1) at or near maturation stages in most cases, (2) some time prior to maturation in few cases, (3) during early segmentation stage in few cases, and (4) in zygote immediately after fertilization in some cases (mosaics).—*C. W. Metz*.

1064. BURCH, D. S. Harnessing heredity to improve the Nation's live stock. U. S. Dept. Agric. Year Book 1919: 347-354. 3 fig. 1919.—The advantages to be expected from the use of pure-bred sires in livestock breedings are discussed in connection with the campaign sponsored jointly by the U. S. Department of Agriculture and a majority of the States for "Better Sires—Better Stock."—*Sewall Wright*.

1065. COMBY, J. La tache bleue mongolique chez les enfants européens. [The blue Mongolian spot on European children.] Arch. Med. Enfants 23: 321-337. 1920.

1066. CORRENS, C. Die geschlechtliche Tendenz der Keimzellen gemischtgeschlechtiger Pflanzen. [Sex tendency of germ-cells in plants of mixed sex.] Zeitschr. Bot. 12: 49-60. 2 fig. 1920.—Protonema were obtained by the regeneration from cells of the wall and the stalk of antheridia and archegonia in the monoecious moss *Funaria hygrometrica* which again produced normal male and female branches. Since such cells are near sister cells of sperms and eggs it is considered that sperms and eggs also possess maleness and femaleness as equal

potencies. Evidence is summarized that sex differentiation in monoecious and hermaphrodite flowering plants is likewise independent of special genetic determiners of sex, that here maleness and femaleness resides equally in the most differentiated of sex organs, and that sex differentiation is here purely a phenotypic development.—A. B. Stout.

1067. CORRENS, C. Individuen und Individualstoffe. [Individuals and individual substances.] Ber. Senckenberg. Naturf. Ges. Frankfurt a. M. 47: 65–66. 1919.

1068. CORRENS, C. Vererbungsversuche mit buntblättrigen Sippen. III. *Veronica gentianoides albocincta*. IV. Die *albomarmorata*- und *albofulvea*-Sippen. V. *Mercurialis annua versicolor* und *xantha*. [Genetical studies with variegated races. III. *Veronica gentianoides albocincta*. IV. The *albomarmorata* and *albofulvea* races. V. *Mercurialis annua versicolor* and *xantha*.] Sitzungsber. Preuss. Akad. Wiss. Berlin 6, 7: 212–240. 1920.—III. *Veronica gentianoides albocincta*. This race of *Veronica* appears to be a case of a real white-margined type of variegation. It is self-sterile. When crossed with normal green plants (*typica*) nothing but green plants appeared in F_1 and F_2 , indicating no inheritance of this variegated character. IV. *Albomarmorata* and *albofulvea* races. Both show a white-green spotting or mosaic that is inherited similarly. The spotting of *albofulvea* is much finer than that of *albomarmorata*. 1. *Ipomoea imperialis chlorina* and *albomarmorata*. The following types were isolated from commercial seed and their genetic constitution determined: a. Normal green (*typica homogenea*), CCNNHH. b. Pale green (*chlorina homogenea*), CCnnHH. c. White-spotted green (*typica albomarmorata*), CCNNhh. d. White-spotted pale green (*chlorina albomarmorata*), CCnnhh. Factor C produces the *chlorina* pigment; factor N changes *chlorina* to normal green; and factor H produces solid leaf color as contrasted with the spotted condition. The latter factor is inherited independently of C and N. 2. *Tropaeolum majus chlorinum* and *albofulveum*. These 2 races of *Tropaeolum* are similar to those of *Ipomoea* noted above. The *chlorinum* type is given the genetic formula CCnnHH and the *albofulveum* type, either CCNNhh (*typica*) or CCnnhh (*chlorina*). V. *Mercurialis annua versicolor* and *xantha*. The *versicolor* race produces seedlings that begin with yellow leaves which later become green permitting the plant to survive. This character is found to be a simple Mendelian recessive to normal green. In the *xantha* race the seedlings are yellow and remain so, the plant eventually dying. Duplicate factors are concerned in the inheritance, giving both 15:1 and 3:1 ratios of green to yellow seedlings.—E. W. Lindstrom.

1069. COSTANTIN, J. Physiologie de l'anthocyane et chimie de la chlorophylle. [Physiology of anthocyan and chemistry of chlorophyll.] Ann. Sci. Nat. Bot. X, 1: xxxviii–lii. 1919.—See Bot. Absts. 7, Entry 411.

1070. COWGILL, H. B. Cross-pollination of sugar cane. Sugar 21: 580–581. 1919.—Methods used in cross-pollination of sugar cane.—C. W. Edgerton.

1071. DAVENPORT, C. B. Influence of the male on the production of twins. Med. Rec. 1920: 1–10. 1920.—“About 1 per cent of all human births are plural births.” Some mothers have more than one pair of twins and may be called “repeaters.” Such women may be considered to have a constitutional “ovarial structure that readily permits double ovulation,” and such structure is conceivably inheritable. Among the “close relatives of repeating mothers” it is found that “the ratio of twin production rises to 4.5 per cent.” But also among the close relatives of fathers of twins it is found that the incidence of twins is as high as 4.2 per cent, hence “the paternal inheritance is real and nearly as potent as the maternal. The problem is to account for this paternal influence. Double ovulation is not universal in women but “is far commoner, proportionately, than twin births.” A study of pregnant swine shows that the number of corpora lutea exceeds the number of embryos and the latter exceed the number of births. Fetuses die at all stages from no apparent cause but inherent weakness. These facts are apparent in human pregnancies.—Geneticists now recognize “lethal factors,” transmitted according to the laws of heredity, “which brought in by one or

both parental germ-cells, inevitably prevent full development." Besides it must be recognized that there is probably a frequent failure of fertilization of the egg, even when conditions would seem to be propitious. From these considerations it is clear that the father as well as the mother may "determine whether both of a pair of simultaneously ovulated eggs shall be fertilized, and whether or not they shall receive lethal factors." There follow comments on uniovular twins and a plea for more complete and accurate observational data by obstetricians.—*Howard J. Banker.*

1072. DEANE, W., AND M. L. FERNALD. A new albino raspberry. *Rhodora* 22: 112. 1920.—A new amber-white or honey-colored raspberry was found by Mr. ROBERT A. WARE on Caribou Mountains, Maine, in 1919. This is a variant of *Rubus idaeus* var. *canadensis*, and should be called *Rubus idaeus* L. var. *canadensis* Richardson, forma *Warei*. The New England "white"-fruited raspberry already known is a form of *Rubus idaeus* var. *strigosus*. [See also Bot. Absts. 7, Entry 1432.]—*Francena R. Meyer.*

1073. DICKSON, M. E. Elements of higher fecundity. *Michigan Acad. Sci. Ann. Rept.* 21: 145-146. 1919.—Fecundity in fowls is limited chiefly by vitality of individual. Breeding for egg production does not increase vitality. It may even cause decrease of vigor, thereby defeating its purpose. In such cases out-crossing is used to restore vigor and hence to increase production. In selecting for vigor, criteria are size of fowl, early maturity, and rapidity of feathering and moulting. Variety of fowl is of little importance except that meat-producing breeds are to be avoided, evidence of this conclusion coming from egg-laying contests in several states. Environment and general management are more important than breed, since many breeds are about equally productive.—*A. Franklin Shull.*

1074. DONCASTER, L. Note on an experiment dealing with mutation in bacteria. *Proc. Cambridge Phil. Soc.* 19: 269. 1919.—It was noticed that the recorded ratio of occurrences in cases of meningitis of the 4 agglutination-types of *Meningococcus* correspond very closely with the ratio of occurrence of the 4 iso-agglutinin groups of blood in a normal human population.—It seemed possible, therefore, that by growing *Meningococcus* of one type in media containing human blood of different groups, mutation to other types might be induced. Experiment showed that considerable differences in type of agglutination resulted, but it was concluded that this was caused by sorting out of races of different agglutinability from a mass culture rather than by true mutation.—*L. Doncaster.*

1075. FEHLINGER, H. Rassenmässige Variation der Körpergrösse beim Menschen. [Racial variations of body size in man.] *Aus der Natur* 16: 212-215. 1920.

1076. FRUWIRTH, C. Beiträge zu den Grundlagen der Züchtung einiger landwirtschaftlicher Kulturpflanzen. V. Gräser. [Contributions to the fundamental principles of cultivation of several agricultural plants. V. Grasses.] *Naturw. Zeitschr. Forst- u. Landw.* 18: 169-178. 1920.—The present paper supplements a previous article of the author appearing in Vol. 14, 1916, of this publication. He describes further experiments in cross and self-fertilization, and concludes, in general, that among the grasses sterility predominates in self-fertilization and that it is possible to find entire vegetative issues which produce no fruit; then again, that individuality is present, and that individuals and often entire vegetative offspring can be singled out, which produce an appreciable, often plentiful, crop of fruit, as a result of self-fertilization. In the cultural practice, the production of seed by self-fertilization will be more or less difficult, for the probability of securing fruit is not strong, and much of the fruit will be sterile.—*J. Roesser.*

1077. GARBER, R. J. A preliminary note on the inheritance of rust resistance in oats. *Jour. Amer. Soc. Agron.* 13: 41-44. 1921.—Author finds evidence of a single hereditary factor-difference with respect to the rust reaction of the host plants used as parents. Resistance apparently behaves as a dominant character in the crosses made.—*F. M. Schertz.*

1078. GASSER, G. W. Report of the work at Rampart Station. Rept. Alaska Agric. Exp. Sta. 1917: 34-57. Pl. 3, 4. 1919.—Results are given of field tests of varieties, crosses, and pure-line strains of farm and horticultural crops.—[See Bot. Absts. 7, Entry 26.]—*Fred Griffie*.

1079. GLEASON, H. A. [Rev. of: GAGER, C. STUART. Heredity and evolution in plants. 14 × 20 cm., xi + 265 p., 113 fig. P. Blakiston's Sons & Co.: Philadelphia, 1920 (see Bot. Absts. 6, Entry 1672).] *Torreya* 21: 14-16. Jan.-Feb., 1921.

1080. GOLDSCHMIDT, RICHARD. Untersuchungen zur Entwicklungsphysiologie des Flügel-musters der Schmetterlinge. I. Mitteilung. Einige Vorstudien. [Investigations of the physiology of the development of the color pattern of the wings in butterflies. I. Some preliminary studies.] *Arch. Entwicklungsmech.* 47: 1-24. 12 fig. 1920.—This investigation is incidental to author's main work concerning heredity in Lepidoptera. Species used are: *Samia cecropia*, *Telea polyphemus*, *Hyperchirio io*, *Callosamia promethea*, and *Anisota stigma*. Investigations were conducted in the Osborn Zoological Laboratory, Yale University, in 1914-18.—The author points out that blood sinuses develop about tracheae and precede formation of veins. These are centers of chemical processes making for color. Pattern is independent of origin of color and complete before color sets in. Main plan of pattern is due to differential growth of wing surfaces following quickly after development of veins and scales, visible first as irregularities of wing surface, indentations, folds, pits, corners, etc., into which later color is, as it were, poured in. Characteristics of folds, depressions, etc., are due to rigidity of veins, pressure of body upon growing wing, folds in wing membrane in pupal case, etc.—Author suggests various collateral subjects for investigation.—*Isabel McCracken*.

1081. GOLDSCHMIDT, RICHARD. Intersexualität und Gesschlechtsbestimmung. [Intersexuality and sex-determination.] *Biol. Centralbl.* 39: 498-512. 1919.—Chief results of an investigation regarding intersexuality and sex-determination are set forth pending publication of a complete account of the work. The results are founded upon breeding 75,000 individuals of the gypsy moth, *Lymantria dispar* L., involving several varieties. [See next following entry.]—*Isabel McCracken*.

1082. GOLDSCHMIDT, RICHARD. Untersuchungen über Intersexualität. [Investigations on intersexuality.] *Zeitschr. Indukt. Abstamm. u. Vererb.* 23: 1-199. 2 pl., 84 fig. 1920.—Results are given from rearing about 75,000 individuals of different races of gypsy moth, which are named according to locality: 5 from Germany, 1 from South Europe, 10 from Japan, 1 from Massachusetts. Normal sexes differ in wings (form and color), antennae, abdomen (shape, size, hairiness), gonads, external genitalia, and instincts (flying, mating). Egg plasma or Y chromosome bears a factor, *F*, for female characters which is inherited unchanged in maternal line and is balanced against factor *M* for male characters, which is carried by X chromosome. In pure stock of different races *FMm* is normal female and *FMM* is normal male, for *F* is stronger than 1 dose of *M* and weaker than 2 doses in determining type of development. *F* and *M* differ in strength in different races as shown by crosses. In development of a "genetic" male, *MM* from weak race may be weaker than *F* from strong race. The latter will predominate after a certain "turning point" in development of a particular structure, which from that point on develops as in male. Similarly a "genetic" female, *F* (weak) *M* (strong) *m*, may have "turning point" after which she develops as male. The greater the difference in "strength" of parental races, the earlier this "turning point," and the higher the grade of intersexuality. Last organs to develop in the embryology are the first to be affected. Organs which have a homologue in the other sex develop up to "turning point" as in "genetic" sex and then may dedifferentiate and continue as in the opposite sex. Strong chitinization hinders dedifferentiation. Other organs develop abnormally after "turning point." Instincts become intersexual. Color is determined very late in pupal stage and hence, in "chief type" of female intersexuality, except in those of very low grade, intersexes resemble males. "Gifu type" of female intersexuality and male intersexuality are alike in being streaked with color of opposite sex in greater or less amount according to grade.

Arrangement of streaks apparently depends upon chance, but amount depends upon time remaining after turning point for protein-splitting, color-forming enzymes to act. In streaked type of intersexuality color spreads out from veins, but in "chief type" of female intersexuality from zigzag lines. This difference is not explained. Other differences of color depend upon character of races entering into cross. Mutation *lunata*, which causes zigzag lines to drop out, can be bred pure, and combined with various types of intersexuality. Hormone secretions for sex and secondary sexual characters are probably the same, are produced in each cell, and not in gonads as in vertebrates. Cytology throws no light upon conditions as X and Y are indistinguishable and no difference appears between races. Attempt is made to correlate strength of races with character of environment. Female intersexuality is produced when females of weak races are crossed with males of strong races, giving *F* (weak *M* (strong) *m*). There is but 1 grade of intersexuality from a particular type of cross except for slight overlapping in plus and minus directions. Grades, depending upon races used, are grouped as follows: (a) Beginning: These show some females grading to normal. All are fertile and hence valuable for genetic work. (b) Weak: These are of "Gifu type," always sterile. (c) Medium: Among others are "Aomori type," with large abdomen filled with unused nourishment; embryonal ovaries; hairiness and form of male. (d) Strong: Some are of "chief type," some of "Gifu" according to parentage. (e) Highest grade: These are sterile but grade into (f). (f) Complete "sex-turnabout:" These are apparently normal males, except that a few grade into (e) and there are 9 perfectly normal females to 2187 males. These "extra females" are explained by non-disjunction of sex-chromosomes. Many *F*₂ and back-cross results are given to corroborate theory of female intersexuality. Intersexual males are usually produced when strong female is crossed with weak male. Fukuoka females by Hokkaido males produce normal females and males varying from apparently normal up to strongly intersexual. Only minus individuals are fertile. (Fukuoka *F*, Hokkaido *M*, *m*) is normal female. (Fukuoka *F*, Fukuoka *M*, Hokkaido *M*) is intersexual male. In later generations it is found that (Fukuoka *F*, Hokkaido *M*, Hokkaido *M*) is female, complete "sex-turnabout." A very few incomplete observations show that after crossing of 2 weak races there may appear male intersexuality. Occurrence of a few "extra males" in crosses where all males should be turned into females is explained by non-disjunction as in case of "extra females."—P. W. Whiting.

1083. GOWEN, J. W. Report of progress on animal husbandry investigations in 1919. Maine Agric. Exp. Sta. Bull. 283. 249-284. 7 fig. 1919.—Logarithmic equations have been determined for yearly yield in milk of the 3 dairy breeds, Holstein-Friesians, Guernseys, and Jerseys. All 3 breeds reach their maximum milk yield when from 8 to 10 years of age.—Sons of various sires have been examined with respect to the sons' ability to transmit high or low milking qualities to their daughters.—A high correlation was found to exist between the milk yield for any 1 lactation period and the average for the first 5. A high correlation also exists between milk production during a 7-day period and the yield during the whole lactation period which either includes the 7 day period or is the one following. On the other hand very little correlation exists between conformation as judged by the score card and milk production.—H. L. Ibsen.

1084. GRIER, N. M. Notes on variation in chicory. Amer. Midland Nat. 6: 148-149. 1919.—Brief note on variation in the number of flowers and involueral bracts of plants of *Cichorium Intybus* growing wild in the Shenandoah Valley, with suggestion that this plant may well be utilized in the laboratory study of variation for classes in biology.—A. B. Stout.

1085. GUNDERSEN, ALFRED. [Rev. of: SMALL, JAMES. The origin and development of the Compositae. 344 p., 40 fig. New Phytologist Reprint No. 11. London, 1919.] Torreyia 20: 125-126. 1 fig. Nov.-Dec., 1920.

1086. HANLY, J. Mendelism and the laws of heredity. Jour. Dept. Agric. Ireland 20: 460-467. 2 fig. 1920.—Popular account and some modern applications.—D. Folsom.

1087. HARRIS, J. ARTHUR, AND C. S. SCOFIELD. Permanence of differences in the plots of an experimental field. *Jour. Agric. Res.* 20: 335-356. 1920.—The fact is generally recognized that heterogeneity is a source of error in experimental field tests. The purpose of the writers is to show whether the differences among experimental plots are permanent or whether they are transitory and are smoothed out by cultivation. Interannual correlations are used as a means of measuring the relative permanency of the differences.—Published data are reviewed for yields of paddy on 17 plots of ranges "B" and "C" of the wet tract of the Experimental Farm at Hebbel, Mysore. The correlation between yields of the same plots for 1905 and 1906 is for range "B" $+0.834 \pm 0.050$ and for range "C" $+0.799 \pm 0.059$. Correlations for yields of ragi on 105 plots of the dry-land experiments of the Mysore state for the years 1905 and 1906, 1905 and 1907, and 1906 and 1907, are $+0.758 \pm 0.028$, $+0.852 \pm 0.018$, and $+0.610 \pm 0.041$, respectively. Correlations are calculated for yields of corn on the same plots in the years 1895, 1896, and 1897, at the Illinois Experiment Station. Yields of corn in the unfavorable year 1895 correlated with yields of the same plots for the favorable years 1896 and 1897 are -0.354 ± 0.054 and -0.221 ± 0.059 , respectively. Yields for the two favorable years 1896 and 1897 show a correlation of $+0.818 \pm 0.020$.—Data were taken from the records of the Field Station of the Office of Western Irrigation Agriculture at Huntley, Montana. Yields were used from 46 plots in a uniform cropping experiment covering the period 1909 to 1919 inclusive. The crops involved in the rotation were sugar beets, alfalfa, corn for grain, oats, corn for silage, and barley. In some cases the plots were subdivided into half and quarter plots. Correlations are calculated between yields of the same plots for different years. Of the 152 correlations calculated for whole plots, 133 are positive and 19 are negative. The average value of the positive correlations is $+0.3346$ as compared with -0.1475 for the negative correlations. For the 152 constants the average value is $+0.2743$.—The data from half and quarter plots substantiate the results for whole plots. The results show conclusively that in general plots which yield more in one year will yield more in other years.—Some evidence is given to show the effect of the yield of a particular crop in the rotation upon the yields of subsequent crops. Plots giving high yields of sugar beets in 1911 showed low yields of alfalfa in 1912. Alfalfa exerted a definite residual influence upon subsequent crops. The effect was not fully shown until the 2nd year after the alfalfa field was plowed, and decreased until little if any effect was shown in the 4th year. Due to the residual effect of alfalfa and its early introduction into the rotation it is impossible to determine to what extent the correlations between the yields of alfalfa and the yields of other crops are due to the variation from plot to plot of the amount of nitrogen fixed by the alfalfa and to what extent due to the original heterogeneity of the experimental plots.—*Fred Griffee.*

1088. HENSEN, V. Die Mutation und was sie über die Entstehung neuer Arten lehrt. [Mutation and what it teaches about the origin of new species.] *Schrift. Naturwiss. Ver. Schleswig-Holstein [Kiel]* 17: 1-12. 2 fig. 1920.

1089. HENSEN, V. Der Vorgang bei der Mutation. [The process in mutation.] *Schrift. Naturwiss. Ver. Schleswig-Holstein [Kiel]* 17: 190-191. 1920.

1090. HONING, J. A. Erfelijkheidsleer zonder Evolutie theoriën. Rede uitgesproken bij de aanvaarding van het Hoogleeraarsambt aan de Landbouwhoogeschool te Wageningen 23 Nov. 1920. [Genetics vs. theories of evolution. Lecture given on assuming the office of Professor at the Agricultural High School of Wageningen, Nov. 23, 1920.] H. Veenman: Wageningen, 1920.

1091. HONING, J. A. Selectie-Proeven met Deli-Tabak. [Selection studies with Deli tobacco.] *Teysmannia* 30: 1-11. 2 pl. 1919.—To increase production without extending acreage, strains may be sought which produce a large number of leaves per plant. For cigar wrapper-leaf, however, quality is more important than quantity production, hence high leaf number is not given first consideration in selection work. Most types of high leaf number are hybrids which continue to segregate indefinitely. Wrapper leaf should be of sufficient

length and breadth, also ratio of width to length is of some importance. In selection work types with leaves in which width is less than 60 per cent of length are rejected. Leaves 11 to 15, counting from base of plant, were measured. Leaf with broad base is better than one with narrow base. Leaf should be thin but strong, supple, elastic. Light colors are much desired and fallow (vaal) shades are preferred over brown. Red colors are very undesirable. Color and other qualities are affected by soil, weather, and fertilizer, and tobacco harvested in early morning cures a purer fallow (valer) than when harvested later in day. Hence, precautions are required in testing inheritance of color. It appears from extensive tests repeated on different estates that color and fineness of tobacco are hereditary characteristics of the various selections. Results of rigorous comparisons made in 1916 and 1917 with a light-colored and a fallow-colored line, showing percentage yields of the different colors for the leaves on lower half of the plant, are given in tables. On higher-lying soil regularly producing darker tobacco the light-colored strain proved decidedly advantageous while on low lands reddish and spangled colors were obtained in unfavorable weather. Conversely, the fallow line gave better colors on the low lands but a darker product on upland soil. Plants have not yet been found fulfilling the ideal of (1) many leaves; (2) long leaves; (3) broad leaves; (4) broad leaf base; (5) short internodes; (6) thin; (7) strong; (8) supple; (9) light color; (10) tan shade; (11) good burn. "Light line" 1, however, is deficient only as to (1) and (10). Light fallow line 72 produces more leaves and a truer fallow shade than the preceding but has less desirable shape of leaf and longer internodes. [See also following entry.]-W. W. Garner.

1092. HONING, J. A. *Selectie-Proeven met Deli-Tabak III*. [Selection experiments with Deli tobacco.] Mededeel. Deli Proefsta. Medan (Sumatra) 2 (no. 6): 25. 1919.—In continuation of previous work (Mededeel. Deli Proefsta. 10: 79-128 and 2d ser., no. 2, 84) critical studies were carried forward with selections, originally obtained from commercial plantings and again propagated in 1918, mainly as to color and length of the fermented leaves taken from the lower half of the plant. In 1918 a total of 357 test plots of 800-1200 plants each, representing 54 lines, with mixed seed as controls, were grown on 12 different estates. With the more promising lines large-scale trials also were made, in some cases more than a million plants being grown. Detailed tabulated data are presented for 13 lines in comparison with mixed seed from which each line was derived, based on 3 primary color grades, with the customary commercial subdivisions of color shades, and the length of leaf. In some instances statistical tables of number of leaves per plant are included. In general, the results of comparisons in 1918 between the selections and mixed seed from which they were derived are in good agreement with those of 1917, showing that the differences in color and length of leaf are hereditary. Some of the selections proved to be segregating hybrids with respect to number of leaves produced. [See also preceding entry.]-W. W. Garner.

1093. HOWARD ALBERT, AND G. L. C. HOWARD. Some labour saving devices in plant-breeding. *Agric. Jour. India* 15: 5-10. *Pl. I*. 1920.—For the prevention of crossing, parchment bags are not suitable in India on account of high temperature and high humidity. Cylindrical muslin covers gave better results with this work. For variety trials a large netted drying house is used, and sheet iron metal cans are used for storing seed which have previously been dried.—J. J. Skinner.

1094. HUMPHREY, SETH K. *The racial prospect*. 261 p. Charles Scribner's Sons: New York, 1920.—As stated in the sub-title, this is a "rewriting and expansion of the author's book 'Mankind.'" It is in fact a revised edition of the former work presenting the same fundamental ideas expanded rather than materially modified by the outcome of the war. The racial heritage of the ages accumulated through natural selection tends to be dissipated by civilization; for civilization preserves the defectives and permits their propagation while the best stock becomes increasingly infertile. There follows an inventory of the racial values preserved in the leading nations. Hybridism of extremely diverse races, as in America, is disastrous to the higher race. The struggle for racial dominance lies

between the English-speaking and the German peoples and will be determined by the conservation of the superior stock in the racial heritage. "The deeper current of human affairs knows nothing of the ripples which so constantly fill our excited vision; it runs silently past the hours of the day to meet the centuries, carrying the racially strong through all accidents of war and peace to ultimate world domination." To meet this situation and to counteract the natural tendencies of civilization, Humphreys conceives a nation-wide conscription and registration of all defectives, the segregation of the incompetent in "farm community centres," and the enforced sterilization of "border-liners." But the cutting off of the defective germ-plasm is not sufficient. The infertility of the superior stock would still lead to the dead level of a mediocre race. To meet the need of propagating from the superior breed, a "new motherhood" is conceived. By scientific methods it is considered "possible to gain a distinguished father for one's children as impersonally as one would take inspiration from his books," and thereby the superior celibate womanhood of the race becomes the preserver of the "great inheritance of mankind."—Howard J. Banker.

1095. KLEBAHN, H. *Impfversuche mit Pfropfbastarden*. [Infection experiments with graft hybrids.] *Flora* 11/12: 418-430. 1918.—Tomato is readily susceptible to disease caused by *Septoria lycopersici* and *Cladosporium fulvum*. The black nightshade, *Solanum nigrum*, is resistant to both of these. In this investigation an effort was made to determine the resistance of various graft hybrids of tomato with the black nightshade to these fungi.—Results of infection experiments on the following chimeras, using *Septoria lycopersici*, are given: *Solanum tubingenense*—the outer epidermis is tomato tissue while all the inner tissues are black nightshade. Plant is resistant. *Solanum proteus*—2 outer layers of cells are tomato tissue. Considerable infection was obtained. *Solanum Koelreuterianum*—epidermis, nightshade; interior, tomato tissue. Infection was obtained. *Solanum Gaertnerianum*—2 outer layers, nightshade; interior, tomato. Both positive and negative results were obtained with infection trials. *Solanum Darwinianum*—epidermis, nightshade; center, nightshade; an intervening area, tomato. Infection was obtained. Experiments with *Cladosporium fulvum* were unsatisfactory and will be repeated.—C. L. Porter.

1096. KNIEP, H. [German rev. of: COLLINS, E. J. Sex segregation in the Bryophyta. *Jour. Genetics* 8: 139-146. *Pl. 6*, 5 fig. June, 1919 (see Bot. Absts. 3, Entry 2103; 5, Entry 1635).] *Zeitschr. Bot.* 12: 685-686. 1920.

1097. LENZ. [German rev. of: NOORDEN, C. VON, UND S. KAMINER. *Krankheiten und Ehe*. Darstellung der Beziehungen zwischen Gesundheitsstörungen und Ehegemeinschaft. (Diseases and wedlock. The relation between ill health and marriage.) 1111 p. Thieme: Leipzig, 1916.] *Arch. Rass.- u. Gesellschaftsbiol.* 13: 208-221. 1918.

1098. LENZ, FRITZ. Oskar Hertwigs Angriff gegen den "Darwinismus" und die Rassenhygiene. [Oskar Hertwig's attack on Darwinism and race hygiene.] *Arch. Rassen- u. Gesellschaftsbiol.* 13: 194-203. 1920.—This is a criticism of Hertwig's whole attitude towards Darwinism and race hygiene, and is directed in particular at his recent pamphlet, "Zur Abwehr des ethischen, des sozialen, des politischen Darwinismus" (Jena, 1918). It is claimed that Hertwig has misconstrued both Darwinism and Lamarckism, and that he has drawn a caricature of race hygiene and the selection theory. His own theory,—a form of determinism depending on a structure and organization of matter by virtue of some inherent "force,"—is held to be philosophically untenable and smacking of the materialistic metaphysics of the 19th century. In the field of ethics, moral value is, according to Hertwig, the directing force; but Lenz maintains with KANT and other philosophers that moral force is outside the world of experience, and that a natural theory which has for its object the laws of "being and becoming," has no application to the principles of values, nor, therefore, of ethics.—L. J. Cole.

1099. LIPSCHÜTZ, A. Bemerkung zur Arbeit von Knud Sand über experimentellen Hermaphroditismus. [Comment on the work of Knud Sand on experimental hermaphroditism.]

Pflüger's Arch. 176: 112. 1919.—Referring to similar work by KNUD SAND on rats, the author points out that he had earlier demonstrated transformation of clitoris into penis-like organ in female guinea-pigs, into which testes had been grafted in place of ovaries.—A. Franklin Shull.

1100. LITTLE, C. C. Is the fertile tortoise-shell tom cat a modified female? Jour. Genetics 10: 301-302. 1920.—Author points out superiority of his non-disjunction hypothesis to DONCASTER's theory of hormone action during embryonic life as an explanation for the production of, and also for the sterility or fertility of, tortoise-shell tom cats.—H. L. Ibsen.

1101. MACBRIDE, E. W. The method of evolution. Scientia 28: 23-33. 1920.—A vigorous attack on the 'mutation theory' of evolution. Since the majority of mutations are recessive in character, and result in 'cripples,' "it seems obvious" to the author "that interesting as the appearance of inheritable potentialities of the mutations are they have nothing to do with the evolution of species and that mutations have not furnished the material for the historical evolution of plants and animals." The Lamarckian doctrine of heritable changes, and consequently of evolution, occurring as the result of use and disuse, in response to needs brought about by environmental change, is then wholeheartedly espoused. The author feels that the experimental work of KAMMERER has not been properly evaluated nor accorded fair treatment by 'Mendelians.' Finally, he stigmatizes as the 'Weismannian nightmare' the idea of a 'germ-plasm' distinct from 'somatoplasm.'—L. J. Cole.

1102. MALAQUIN, A. Reproduction sexuée et reproduction asexuée. [Sexual and asexual reproduction.] Compt. Rend. Acad. Sci. Paris 171: 1403-1406. 1920.—In the annelid family Serpulidae, *Salmacina Dysteri* (Huxley) has sexual and asexual forms which have developed under apparently the same conditions. In 772 individuals there were 93 sexual hemaphrodites, 245 divided or preparing to divide asexually, and 434 unclassified. At the season of sexual activity in the sexually reproducing forms the asexual animals show an increase in size of sex glands and functional activity to almost the normal condition.—D. F. Jones.

1103. METZ, CHARLES W., AND JOSÉ F. NONIDEZ. Spermatogenesis in the fly, *Asilus sericeus* Say. Jour. Exp. Zool. 32: 165-185. 2 pl. 1921.—The spermatogonial chromosomes are 10 in number, arranged in 5 pairs; the sex chromosomes have not been identified. The paired association of chromosomes is retained up to and through the final spermatogonial division. Synapsis is effected in telophase at the beginning of the growth period by the intimate association of chromosomes that were already paired in anaphase, and the union effected at this time persists throughout the succeeding growth period. No leptotene or zygotene stages, in the usual sense, could be found. Tetrad structures are not visible. The 1st maturation division appears to be reductional for all the chromosomes.—Bertram G. Smith.

1104. NACHTSHEIM. [German rev. of: ARMBRUSTER, LUDWIG. Bienenzüchtungskunde. Versuch der Anwendung wissenschaftlicher Vererbungslehren auf die Züchtung eines Nutztieres. (The art of breeding bees. An experiment in the application of scientific genetics to the breeding of a domestic animal.) 22 fig. Th. Fisher: Leipzig and Berlin, 1919.] Biol. Centralbl. 40: 575-576. 1920.

1105. NOACK, KONRAD. [German rev. of: CORRENS, C. Vererbungsversuche mit buntblättrigen Sippen. I. *Capsella bursa-pastoris* albovariabilis und chlorina. (Genetical studies with variegated races. I. *Capsella bursa-pastoris* albovariabilis and chlorina.) Sitzungsber. K. Akad. Wiss. Wien 34: 585-610. 1919 (see Bot. Absts. 4, Entry 551).] Zeitschr. Bot. 12: 675-678. 1920.

1106. NOACK, KONRAD. [German rev. of: CORRENS, C. Vererbungsversuche mit buntblättrigen Sippen. II. Vier neue Typen bunter Periklinalchimären. (Genetical studies with variegated races. II. Four new types of variegated periclinal chimeras.) Sitzungsber. K. Akad. Wiss. Wien 44: 820-857. 1919 (see Bot. Absts. 4, Entry 550).] Zeitschr. Bot. 12: 678-680. 1920.

1107. NOACK, KONRAD. [German rev. of: STOMPS, THEO J. Über zwei Typen von Weissrandbunt bei *Oenothera biennis* L. (On two types of white margins in *Oenothera biennis*.) Zeitschr. Indukt. Abstamm.- u. Vererb. 22: 261-274. 1920 (see Bot. Absts. 8, Entry 1211).] Zeitschr. Bot. 12: 680-682. 1920.

1108. NONIDÉZ, JOSÉ F. The internal phenomena of reproduction in *Drosophila*. Biol. Bull. 39: 207-230. 10 fig. 1920.—In spite of the large amount of genetic work with *Drosophila*, heretofore there has been available no description of the morphology and physiology of the internal reproductive organs of the species. This deficiency, which is of considerable importance to those interested in hybridizing experiments, is supplied in the well illustrated description here given. Two points of importance in addition to the purely morphological features are the demonstration that the spermatozoa are retained for several days after copulation in both the spermathecae and the median ventral receptacle, and the suggestion that the spermatozoa are activated by the secretion of the parovaria, certain accessory glands connected with the uterus.—H. H. Plough.

1109. PEARSON, KARL. Notes on the theory of correlation. Biometrika 13: 25-45. 3 fig. 1920.—Pearson traces the early development of the theory of correlation and corrects his earlier "errors of ascription" by giving to GALTON the whole credit of discovering the correlation calculus. The work of GAUSS and of BRAVAIS on the probability curve and the theory of errors is shown to have had a bearing only upon determining the position of indirectly observed points from observed independent variables, mainly in geodesy and astronomy, and although Bravais reached the correlation surface he had not the idea of correlation. Pearson then reviews Galton's early papers on correlation, presents 3 of his figures, and outlines the development and interpretation of his measures of the coefficient of regression. WELDON's papers on correlation in shrimps and crabs, and EDGEWORTH's on "Correlated averages" are briefly reviewed to show that they added almost nothing to the theory.—Henry E. Niles.

1110. RENNER, O. [German rev. of: (1) VRIES, HUGO DE. Mass mutations and twin hybrids of *Oenothera grandiflora* Ait. Bot. Gaz. 65: 377-422. May, 1918 (see Bot. Absts. 1, Entry 219). (2) VRIES, HUGO DE. Phylogenetische und gruppenweise Artbildung. (Phylogenetic and group-wise species formation.) Flora 11-12 (Festschr. E. Stahl): 208-226. 1918 (see Bot. Absts. 5, Entry 349).] Zeitschr. Indukt. Abstamm.- u. Vererb. 24: 175-178. Sept., 1920.

1111. RICHET, C., ET H. CARDOT. Mutations brusques dans la formation d'une nouvelle race microbienne. [Sudden mutations in the formation of a new race of microbes.] Compt. Rend. Acad. Sci. Paris 168: 657-663. 1919.—Four months' daily observation of a pure lactic ferment organism in an arsenical medium showed that its essential function,—the formation of lactic acid,—was so developed as to suggest a new race. The formation of this race was not gradual, but sudden; and its developed functions remained stable, not only on the medium in which development took place, but also on other media.—Andrew I. Dawson.

1112. RIDDLE, O., AND H. A. CARR. Posthumous works of Charles Otis Whitman. Carnegie Inst. Washington Publ. 257. Vol. 1. $x + 194$ p., 88 pl., 36 fig; Vol. 2. $x + 224$ p., 39 pl., 11 fig; Vol. 3. $xi + 161$ p. 1919.—Volume I. The derivation of bars, as shown by *Columbia livia* and domestic races of pigeons, from cheeks and these in turn from a common avian character, constitutes the main thesis of this volume. This character still persisting in pigeons and other birds, is well preserved in the oriental turtle dove of China. It also occurs in the juvenile plumage of modern pigeons. The check mark of so-called checkers was derived by an apical splitting of the check of the turtle dove until only two spots remained, on the inner and outer vanes respectively, of the feather. By a further modification of these checks bars were derived. Therefore Whitman considers the checker the *affinis* type and the barred the *livia* type. By selection experiments the author was able to reduce the number of checks to 4 bars and then to 3, and so on until a pure gray wing resulted. The process

was, however, irreversible. Whitman concludes that the same law of orthogenesis holds for various other orders of birds. In the latter part of the volume there are 2 chapters on "Fundamental bars and frills" and "The mutation theory and mutations." In the latter, 3 mutations occurring in Whitman's stocks are described.—Volume II contains data relating to many close and wide crosses between doves and pigeons. The main deductions are as follows: The wider the cross the lower the fertility and the greater the tendency for the production of males; fertility is lowest in the autumn with an excess of females and highest in the spring with an excess of males. The stronger germs are produced early and give rise to males, while the later germs are weaker and produce females. Color follows the same law. The appearance of white and certain abnormalities are signs of weakness. There is also a discussion and a presentation of data relating to sex-linkage. About two-thirds of Volume III deals with the behavior relating to reproduction, such as sexual activities, nesting, egg-laying, onset of incubation, and feeding of young. These are discussed in some detail and then related to the variations of different species and the sexes. The other third of the volume is taken up with miscellaneous subjects. The voices of different species are discussed. Certain elements of the voice of the turtle dove are noted in those of the common pigeon. Voices of hybrids are blended. Various other acts of behavior peculiar to pigeons, such as homing, tumbling, and pouting, are considered.—*Sarah V.H. Jones.*

1113. RIXFORD, G. P. Some results of fig breeding by the U. S. Dept. of Agr. Fig and Olive Jour. 4^o: 12, 13. 1920.—"Fertile seeds can be secured from all kinds of common figs." A branch with pistillate figs about 1-2 cm. in diameter is bagged with a caprifig fruit containing mature *Blastophaga*, and the pollination is left to the insects. Figs containing fertile seeds may differ from unpollination fruits in size, shape, and time of ripening. Hybrids between varieties of the Adriatic class and caprifigs of the Smyrna class are about half caprifigs [staminate]. Several promising seedlings are described.—*Howard B. Frost.*

1114. ROMMEL, GEO. M. Essentials of animal breeding. U. S. Dept. Agric. Farmers' Bull. 1167. 38 p., 32 fig. 1920.—The basic facts about heredity and the breeding of farm animals together with the principles to be followed in livestock improvement are discussed in this bulletin, in popular language.—*Sewall Wright.*

1115. S., E. J. [Rev. of: GAGER, C. STUART. Heredity and evolution in plants. 14 X 20 cm., xi + 265 p., 118 fig. P. Blakiston's Son & Co.: Philadelphia, 1920 (see Bot. Absts. 6, Entry 1672).] Sci. Prog. [London] 15: 498. 1921.

1116. SANDO, CHARLES E., AND H. H. BARTLETT. Rutin, the flavone pigment of *Escholtzia californica* Cham. Jour. Biol. Chem. 41: 495-501. Pl. 6-7. April, 1920.—"The petals of *Escholtzia californica* contain nearly 5 per cent of rutin (quercetin glucosorhamnoside). In view of the great range of (flower) colors in *Escholtzia*, from golden yellow to white, and from white to rose, this genus would appear to afford especially suitable material for study of the physiological and genetic relationships of the flavonol and anthocyanin pigments."—*Leonas L. Burlingame.*

1117. SCHULTZ, WALTHER. Kälteschwärzung eines Säugetieres und ihre allgemeinbiologischen Hinweise. [Blackening by means of cold in a mammal and its general biological implications.] Arch. Entwicklungsmech. 47: 43-75. 12 fig. 1920.—Author made experiments on rabbits with pink eyes, white body, and black ears, nose, tail, and feet, to determine the influence of heat and cold on coat color. He was able to change the white color into black and to produce diverse types of hair-color patterns, through the influence of cold. The nature and cause of arctic white and black animals is also discussed.—*John H. Schaffner.*

1118. SEMON, RICHARD. Über das Schlagwort "Lamarckismus." [On the catch word "Lamarckism."] Zeitschr. Indukt. Abstamm.- u. Vererb. 22: 51-52. Dec., 1919.—Author refers to criticisms of H. SIEMENS regarding an article by the author on "The footprint of man," published 5 years ago. Siemens has referred to the article as a Lamarckian expla-

nation and therefore incapable of accounting for phylogenesis. The author replies, however, that no such inference can be drawn and that he has always warned against confusing the catchword "Lamarckism" with the phenomena of somatic inheritance, the interpretation of which can be placed upon a purely physiological basis.—*M. A. Jull.*

1119. SHAFFER, E. L. A comparative study of the chromosomes of *Lachnosterna* (Coleoptera). Biol. Bull. [Woods Hole] 38: 83-103. 1920.—The diploid chromosome groups of 4 species of *Lachnosterna* (namely, *delata*, *fusca*, *gracilis*, and *tristis*), as well as *Pelidnota punctata* and *Cotalpa lanigera*, show 20 chromosomes, 1 pair of which is composed of 2 unequal elements (sex chromosomes). There are no essential differences in the form and arrangement of the chromosomes in the species studied. Cyst formation in the testis begins by a rapid division of a single primary spermatogonium, so that all the cells within any particular cyst are the descendants of a single cell. The visible polarity of the cell seems to be established at the time of cyst formation. The growth period of the spermatocytes is marked by the appearance of delicate leptotene threads which are derived from the chromosomes of the last spermatogonial division; these threads become polarized and there is evidence that they are arranged in pairs parasynaptically. There is a definite contraction phase. The sex chromosomes persist through the entire growth period in the form of compact bodies, sometimes being contained within chromosomal vesicles. The unequal sex elements separate in the 1st maturation division and divide equationally in the 2nd maturation division. In the 1st maturation division there are 5 atelomitic tetrads and 5 telomitic tetrads, the latter including the sex pair.—*Bertram G. Smith.*

1120. SLYE, MAUD. The relation of inbreeding to tumor production: studies in the incidence and inheritability of spontaneous tumors in mice. Jour. Cancer Res. 1920.—Author states that it is impossible to prove inheritability of any character without inbreeding. Inbreeding reveals what is in a strain, nothing is "increased" or "intensified." Pedigrees are given to show that inbreeding does not increase the incidence of cancer unless selection of the cancer-bearing strains in a mixed population is made.—It is concluded that consistent inbreeding eliminates any strain, and that inbreeding within a cancer strain speedily eliminates the strain and instead of increasing cancer, as some have inferred, it eliminates cancer. Hybridization increases cancer by increasing the output of cancer progeny. Cancer behaves as a recessive. [See Bot. Absts. 7, Entry 1727.]-*C. C. Little.*

1121. STOMPS, THEO. J. Über zwei Typen von Weissrandbunt bei *Oenothera biennis* L. [On two types of white variegation in *Oenothera biennis* L.] Zeitschr. Indukt. Abstamm.-u. Vererb. 22: 261-274. 1920.—Author presents data bearing upon the heredity, in *Oe. biennis* L., of 2 types of white variegation, as well as evidence for the appearance of these types by mutation, their perpetuation by latent, semi-active, or active genes, and their expression as phenomena of vegetative splitting. The works of CORRENS, BEYERINCK, GREGORY, BAUR, and KÜSTER are discussed at length. In the 1st type of variegation vegetative mutation occurs in the periclinally dividing apical cell producing (1) green twigs and (2) twigs with white-margined leaves. Selfed seed from green twigs give green, from variegated twigs white, and the cross, variegated \times green, a vegetative splitting into white and green cell complexes, in the F₁. The latter are piebald variegated identical with types which have arisen by mutation from pure green *Oe. biennis* \times *Oe. biennis cruciata*. In either case such plants are produced by the union of a "green" germ-cell with one mutated to "white." The results of selfing green, nearly green, variegated, and strongly variegated twigs of the piebald-variegated plants warrant the conclusion that each cell complex has reached a definitive condition which may be transmitted to its offspring. The following types fall in the piebald variegated class: *Mirabilis jalapa albomaculata* and *Arabis pallida pseudo-leucodermis*, studied by Correns, *Pelargonium zonale albomarginatum* and *Antirrhinum majus albomaculatum*, by Baur, and an *albomaculata* type of *Primula sinensis* reported by Gregory. In all of these types the chlorophyll factor is carried over in a perlabile condition. In *Mirabilis jalapa*, reciprocal crosses, *albomaculata* \times normal green, Correns and Baur report con-

flicting results, Correns finding strict matrocliny and Baur the production of piebald variegated plants as well as white and green. The mutation coefficient, "green" to "white," is 0.01 per cent, such mutations probably occurring in the somatic cells before the flower appears. Three methods are possible, (1) vegetative mutation, (2) mutation in the gametes, and (3) the appearance of variegation as an intermediate character between 2 races. The latter possibility is illustrated by the author's 2nd type of variegation. A plant of this type appeared by mutation in 1918. Selfed green twigs, variegated twigs, the cross, variegated \times green, and the cross, variegated \times a constant *chlorina* type from *Oe. suaveolens* \times *Oe. Hookeri*, all gave green progeny, the latter heterozygous for a chlorophyll factor. This type constitutes an intermediate race. Its characters in so far as they may be called specific are designated by the writer as "taxonomic anomalies."—Corren's hypothesis that white variegation is due to a disease condition is summarily dismissed and the alternative hypothesis of a special condition of the gene for the development of chlorophyll for each cell complex, advanced. The white sub-epidermal layer in Corren's *Arabis pallida pseudoleucodermis*, for instance, appears as the expression of a semi-latent gene for normal green pigment.—In closing the author says, "*La vérité est en marche; rien ne l'arrêtera.*" [See also Bot. Absts. 8, Entry 1107].—Paul A. Warren.

1122. TISCHLER, G. [German rev. of: FLORIN, RUDOLF. *Zur Kenntnis der Fertilität und partiellen Sterilität des Pollens bei Apfel und Birnensorten.* (On the fertility and partial sterility of the pollen of different varieties of apples and pears.) *Acta Horti Bergiani* 7: 1-39. 1920 (see Bot. Absts. 5, Entry 1503).] *Zeitschr. Bot.* 12: 687-688. 1920.

1123. VAN DENBURGH, JOHN. A further study of variation in the gopher snakes of western North America. *Proc. California Acad. Sci.* 10: 1-27. 2 pl. 1920.—A study of the variations of number of gastroteges, dorsal color pattern blotches, and scale rows has revealed the existence of 7 geographical races of the western North American gopher snakes, *Pituophis*. On the basis of number of gastroteges 2 subspecies were formerly recognized. Those having the lower number, *P. cantenifer cantenifer*, occur in the cool northern coast and adjacent interior regions extending to middle California. The number of gastroteges increases in the southern regions where is found *P. c. annectens*. Within these subspecies geographic variation in color pattern exists, the coast forms having a higher number of blotches than the interior forms; *P. c. heermanni* is the northern interior form having fewer color blotches than the coast form of the same latitude. The same distinction is found between coast and interior forms of the southern group. The interior form here is designated *P. c. deserticola*. The number of scale rows also shows geographical variation permitting a further subdivision. The northern and southern divisions named above fall into 2 groups while the snakes of Lower California, Utah (*rutilis*), and Arizona (*stejnegeri*) form 3 different groups, the latter 2 being subspecies, that of Lower California a true species, *P. vertebralis*. The author has thus divided 3 groups into 7 on the basis of geographic variation of at least 3 characters. A key for the identification of the 7 groups is given.—J. L. Collins.

1124. VRIES, EVA DE. Versuche über die Frucht- und Samenbildung bei Artkreuzungen in der Gattung *Primula*. [Study on fruit and seed formation in species crosses of the genus *Primula*.] *Rec. Trav. Bot. Néerland.* 16: 63-205. 1919.—Study in detail on seed and fruit formation in species crosses between *Primula acaulis*, *P. Sibthorpii*, *P. elatior*, *P. Juliae*, *P. Auricula*, and *P. hirsuta* with special reference to self and cross-pollination as related to heterostylism. Short-style \times short-style and long-style \times long-style represent illegitimate unions in author's classification, while long-style \times short-style and its reciprocal are designated legitimate. Illegitimate unions are of two kinds—those from selfing and those derived from crossing plants of either the same or of different species, but with the same type of style. When protected against insects, there is no self-pollination in *P. acaulis*. In profuse-flowering stocks of *P. elatior*, spontaneous selfing takes place in short-style, but very rarely in long-style plants. Artificial self-pollination in case of *P. acaulis* and *P. elatior* give different results with the two style types. Long-style *P. acaulis* gave about 25 per cent fruits as

against less than 1 per cent fruit in short-style selfings (159 pollinations gave one fruit). Fruits in both cases have good seed. Results in *P. elatior* somewhat similar. Illegitimate pollinations of long-style *P. acaulis* \times long-style *P. elatior* gave no results. Illegitimate pollinations of *P. Sibthorpii* \times *P. elatior* and of *P. Auricula* gave only negative results. Legitimate unions in *P. acaulis*, *P. acaulis* \times *P. Sibthorpii*, and reciprocals fruit readily and seed is similar in all in number, size, and weight. F_1 *P. acaulis* \times *P. Sibthorpii* is fertile and crosses back with either parent. Legitimate unions of *P. acaulis* \times *P. elatior* are more difficult to secure than legitimate unions between plants of *P. acaulis*, but less difficult than illegitimate unions. Fruit and seed in general are very small and seed weight at most half that of seed of pure species. Reciprocal (*P. elatior* \times *P. acaulis*) in legitimate cross-pollination sets fruits readily and gives 50-60 per cent very large seed, and remainder very light. Legitimate cross-pollination of *P. acaulis* by *P. Juliae* produces fruit as readily as legitimate unions in *P. acaulis*, but seeds, though equal in number, are lighter and smaller. F_1 hybrids are fertile. F_1 back-crossed with parents in legitimate unions gave seed as large and numerous as in *P. acaulis*. *P. elatior* fruits readily in legitimate cross-pollination. Legitimate cross-pollination of *P. elatior* by *P. Sibthorpii* gives results similar to *P. elatior* \times *P. acaulis*. Reciprocal crosses (12) gave only one fruit with very small seeds. Long-style *P. elatior* \times *P. Juliae* short-style, fruited and seeded as readily as pure *P. elatior* in legitimate unions. F_1 hybrids are fertile in legitimate unions. Both style-forms of *P. Auricula* in legitimate unions set fruit readily. Legitimate crosses of *P. Auricula* by *P. hirsuta* and reciprocal set easily. Legitimate crosses between plants of *P. hirsuta* are fertile. Seeds of *P. Auricula*, *P. hirsuta* and their hybrids from legitimate unions are indistinguishable. Literature on the subject is reviewed.—Orland E. White.

1125. WHITE, WILLIAM A. [Rev. of: KNIGHT, M. M., IVA, L. PETERS, AND PHYLLIS BLANCHARD. *Taboo and genetics*. 301 p. Moffat, Yard and Co.: New York, 1920.] *Mental Hygiene* 5: 194-195. 1921.

1126. WRIGHT, SEWALL. The relative importance of heredity and environment in determining the piebald pattern of guinea-pigs. *Proc. Nation. Acad. Sci. [U. S.]* 6: 320-332. 6 fig. June, 1920.—Correlation between parents and offspring was found to be $+0.211 \pm 0.015$ for random-bred stock with piebald pattern, while it was found to be only $+0.014 \pm 0.022$ for stock inbred for many generations. Variability in inbred stock is thought to be due almost entirely to irregularity in development. By biometrical methods it has been determined that for the random-bred stock "variations in pattern are determined about 42 per cent by heredity, and 58 per cent by irregularity in development, leaving nothing for tangible environmental factors. In the inbred family the corresponding figures are 3 per cent for heredity, 5 per cent for tangible environment, and 92 per cent for irregularity in development."—H. L. Ibsen.

1127. YAMPOLSKY, CECIL. Sex intergradation in the flowers of *Mercurialis annua*. *Amer. Jour. Bot.* 7: 95-100. 1 pl. Mar., 1920.—Typical flowers for male, female, and monoecious forms in this species are described, and various grades of hermaphrodite flowers are described and figured for both female and monoecious forms. These develop in various grades of maleness along with complete femaleness, or in various gradations in the proportion of the two, with in many cases no loss of functioning power of the organs formed. "Most elaborate and varied transition stages appeared of stamens into pistils and of pistils into stamens." "Intergradations within the flowers may occur by steps that are almost insensible." A periodic alteration of sex is reported for monoecious plants.—It is pointed out that a factorial hypothesis of sex determination does not explain these results; that no definite factor determines the sex of a flower, but that sex is here an epigenetic condition.—A. B. Stout.

HORTICULTURE

J. H. GOURLEY, *Editor*H. E. KNOWLTON, *Assistant Editor*

(See also in this issue Entries 771, 838, 866, 888, 915, 1058, 1060, 1078, 1087, 1113, 1122, 1346, 1388, 1396, 1420, 1446, 1457, 1499, 1513, 1523, 1525)

FRUIT AND GENERAL HORTICULTURE

1128. ALBERT, C. Utilisation des serres sans chauffage au charbon, ni fumier. [Utilization of greenhouses without heat from coal or manure.] *Revue Hort.* 92: 166-167. 1920.

1129. ANONYMOUS. Grafting of walnut trees. *Amer. Nut Jour.* 10: 12. 1919.—Discussion by members of the Western Walnut Growers Association. When grafting is done low down on the ground the graft will start and then die. Hence better results are obtained from trees grafted some distance above the ground. It was found that fine crops may be obtained when the grafting is carried out 12 feet above the surface of the ground.—*E. L. Overholser.*

1130. ANONYMOUS. Making lime-sulphur at home. *British Columbia Dept. Agric. Circ. New Hort. Ser.* 61. 5 p. 1920.

1131. ANONYMOUS. [Rev. of: GOULD, H. P. *Peach-growing.* xxi + 426 p. The Macmillan Co.: New York, 1918.] *Sci. Prog.* [London] 15: 147. 1920.

1132. ANONYMOUS. [Rev. of: HEDRICK, U. P. *Manual of American grape-growing.* xiii + 468 p. The Macmillan Co.: New York, 1919.] *Sci. Prog.* [London] 15: 147-148. 1920.

1133. BIOLETTI, T. FREDERIC. Propagation of vines. *Univ. California Agric. Exp. Sta. Circ.* 225. 4 p. 1920.—Directions for the propagation of vines are discussed under the following heads: (1) Choice of cuttings; the best wood for cuttings is of medium size and with moderately short joints. (2) Time of making cuttings; best to make the cuttings as soon as possible after the vines are pruned. (3) Method of making cuttings; cuttings $\frac{1}{2}$ – $\frac{3}{4}$ inch in diameter are best and not more than 1 inch at the butt or less than $\frac{1}{4}$ inch at the top; the shorter the better, providing they can be made to root. (4) Care of cuttings; discussion of methods of handling cuttings. (5) Planting of cuttings, including field practices. (6) Digging and care of rooted vines.—*A. R. C. Haas.*

1134. BONVALLET, E. Radis noir Poids d'horloge, sa culture. [The culture of the black radish, Poids d'horloge.] *Revue Hort.* 92: 164. *Fig. 57.* 1920.—This is one of the best winter radishes of commercial importance. It requires careful selection to maintain it at a high standard of quality. The seeds are planted from the end of May to the end of July.—*E. J. Kraus.*

1135. BULLARD, W. P. National Pecan Growers' Exchange. *Amer. Nut Jour.* 10: 55-56. 1919.—The co-operation marketing of this exchange has centralized control, efficiently standardized grade and brand, and has stabilized market. Distribution has been effected with scientific precision, and the speculator's net profit becomes distributed to the growers as extra profit.—*E. L. Overholser.*

1136. BURNS, W. The top-working of Indian fruit trees. *Agric. Jour. India* 15: 516. 1920.

1137. CHEVALIER, AUG. Sur les variations de bourgeons des arbres et arbustes cultivés comme de décadence des variétés anciennes. [On bud-variations of trees and cultivated shrubs as a cause of the degeneration of old varieties.] *Compt. Rend. Acad. Sci. Paris* 171:

1011-1014. 1920.—It is contended that bud-variations are the cause of varieties "running out." Examples are given from the citrus fruits as well as from the apple, pear, olive, and cherry. Mention is also made of *Myrtus communis* and *Acer negundo* var. *folis argenteo variegatus*. It is therefore concluded that sexual reproduction at intervals is advisable in horticultural varieties.—C. H. Farr.

1138. CONDIT, I. J. The fig in the Sacramento valley. Monthly Bull. Dept. Agric. California 8: 591-595. 1919.—The following are the 4 varieties of figs chiefly grown commercially in California: Mission, Adriatic, Smyrna, and Kadota. The Smyrna, although of better quality than the Adriatic, is more exacting as regards climate and soil requirements, and although yielding a better dried product is not as good a shipper as the Kadota. For Sacramento valley the author recommends the Black Mission, which is an excellent variety for commercial planting on account of the quality, and the certainty and size of its crop.—E. L. Overholser.

1139. CRAFTS, H. A. Cover crops for our orchards. Sci. Amer. 123: 567, 582-583. 1 fig. 1920.

1140. CROW, J. W. Biennial fruitbearing in the apple. Sci. Agric. [Canada] 1: 39-40. 1921.—Biennial bearing is not a fixed characteristic of Duchess and Wealthy varieties. Growths of spurs are classified according to length, those from 4 to 9 mm. bearing nearly all the fruit. To secure annual fruiting it is necessary to stimulate growth of the tree in the non-bearing year. Experiments at Ontario Agricultural College indicate that this is accomplished by moderate heading back of small branches in the non-bearing year, and by applying nitrate of soda in the early spring. Observations show that 75 per cent of fruit spurs on these varieties have completed their growth for the season by the time the first blossoms have well set.—B. T. Dickson.

1141. DANIEL, LUCIEN. Recherches sur la greffe des Solanum. [Investigations of the grafts of Solanum.] Compt. Rend. Acad. Sci. Paris 171: 1074-1076. 1920.—A study of grafts of potato on tomato and on mad-apple. Some of the characters of the stock, such as delay in maturing of the fruits, are imparted to the scion, thus making a situation similar to that in grafts of *Vitis vinifera* on *V. rupestris*. These new characters are transferred by asexual propagation. The tomato used as a stock is also found to affect the nature of the fruit of the mad-apple.—C. H. Farr.

1142. DORRIS, G. Establishing the filbert grove. Amer. Nut Jour. 10: 34-35. 1919.—Soil must be retentive of moisture,—river bottom soil is best. As filbert blooms and pollinates in mid-winter, location requires no consideration as to frost conditions. The Davidiana is the best pollenizer for most varieties. Each year's growth is to be cut back about 2 feet; should not head higher than 2 feet,—preferably 1 foot.—E. L. Overholser.

1143. ENFER, V. Utilization des serres sans chauffage: production des légumes. [Utilizing greenhouses without heat: growing vegetables.] Revue Hort. 92: 179-180. 1920.—The specific crops and varieties most suitable for culture in greenhouses without artificial heat, together with the directions for planting and culture of the same, are given.—E. J. Kraus.

1144. ESTEBAN DE FAURA, ANTONIO. Cultivo del olivo. [Cultivation of the olive.] El Agricultur [Santiago, Chile] 5: 123-126. 3 fig. 1920.—Reprinted from La Hacienda.—J. A. Stevenson.

1145. GARDNER, V. R. Bud selection with special reference to the apple and strawberry. Missouri Agric. Exp. Sta. Res. Bull. 39. 27 p. 1920.—See Bot. Absts. 3, Entry 1155.

1146. GAVILÁN, JUAN. Producción y cultivo de plátanos. [Production and cultivation of bananas.] Informacion Agric. [Madrid] 11: 1-2. 1 fig. 1921.—The banana industry of the Canary Islands is discussed.—John A. Stevenson.

1147. HAWKINS, LON A., AND J. R. MAGNESS. Some changes in Florida grapefruit in storage. Jour. Agric. Res. 20:357-373. 1920 [1921].—Determinations of percentages of sugars, acids, dry matter, shrinkage of fruit, peel and the thickness of peel of grapefruit (*Citrus decumana*) when stored at 32, 36, 40, 55 = 5, 70, and 86° F. are reported. The fruit keeps longer at low temperatures, decay is reduced, shrinkage is less, and physiological processes are retarded. Fruit stored at 40° F. or below shows an undesirable pitting of the peel. Sunken spots appear which become 1-2 mm. in diameter and brown in color. The pit does not extend into the fruit and the flavor is unaffected. Most pitting occurred at 40° F., and none was observed at the higher temperatures. Flavor of the fruit improves in cold storage, but this improvement is more rapid at higher temperatures. The titratable acids in the fruit decrease after the fruit is removed from the tree and placed in cold storage. There is an apparent increase in sugar content in cold storage. Shrinkage is from 5 to 8 per cent in cold storage and about 23 per cent in warm ventilated storage.—D. Reddick.

1148. HOY, B. Orchard cover-crops. British Columbia Dept. Agric. Circ. New Hort. Ser. 51. 6 p., 3 fig. 1919.

1149. HOY, B. Selection of orchard sites and soils. British Columbia Dept. Agric. Circ. New Hort. Ser. 53. 7 p., 2 fig. 1919.

1150. HOY, B., AND H. H. EVANS. Pruning fruit-trees. British Columbia Dept. Agric. Circ. New Hort. Ser. 60. 20 p., 21 fig. 1920.

1151. LECOLIER, P. Un mode de greffage à préconiser; la greffe anglaise appliquée au cerisier. [A noteworthy method of grafting; the splice-graft used on the cherry tree.] Revue Hort. 92:161-162. 1920.—The cions, of approximately the same diameter as the top of the tree to be grafted, are set in place during September, preferably the latter half of the month. After tying, a light protection of wax is advantageous. The following spring and summer the new growths may be pinched back to cause a more profuse branching of the top and the trees may be sold the autumn of the same year. The method is applicable to other stone fruits, and to apples and pears though these develop more slowly when the lateral branches are suppressed.—E. J. Kraus.

1152. LINDEN, VAN DER, J. G. HAZELOOP, EN N. VAN POETEREN. Proefneming met rook, ter bescherming van gewassen tegen nachtvorsten. [Experiments with smoke, for protection of plants against night frosts.] Mededeel. Phytopath. Dienst Wageningen 15. 22 p., pl. 1-4. 1920.—By burning fuel which develops much smoke or soot the temperature can be increased considerably over large areas. The rise of temperature is due mainly to decreased radiation from the soil on account of the cover of smoke. Direct heating of the air also takes place. Smudging of small areas from the windward side is not advisable as there is no certainty that the smoke will sufficiently cover a certain area. Peat saturated with crude naphthalene is very useful, giving much smoke and heat.—The cost per 2½ acres (1 Ha.) of raising the temperature 1°C. for 1 hour is from 40 to 50 gulden (\$16 to \$20).—The experiments were carried out in Amersfoort and Elst.—J. C. Th. Uphof.

1153. MOREL, F. Remarque sur la culture du Pêcher. [Note on peach culture.] Revue Hort. 92:178. 1920.—Peach trees when grown against walls are generally set either on the east or south face. When it becomes necessary to replace such plantings the new trees may be set on the west or north face and the tops of the trees drawn through holes in the wall to the opposite, more desirable, exposure.—E. J. Kraus.

1154. MORRIS, O. M. Prune growing in western Washington. Washington [State] Agric. Exp. Sta. Popular Bull. 120. 21 p., fig. 1-7. 1920.—Attention is given to varieties, pruning, cultivation, and fertilizer trials. The fertilizer trials indicated that nitrogen is the element most frequently deficient in the prune orchards of Clark County. Other factors causing crop failure are unfavorable weather at blossoming time and the brown-rot.—F. D. Heald.

1155. MORRIS, ROBERT T. Comment. [Rev. of: KNIGHT, F. A. Propagation of the walnut. Trans. Hort. Soc. London 3: 133. 1918.] Amer. Nut Jour. 11: 20-21. 1919.—Critical comments on F. A. Knight's "Propagation of the walnut."—*E. L. Overholser.*

1156. MUNSON, K. W., AND E. W. WHITE. Loganberry culture. British Columbia Dept. Agric. Circ. New Hort. Ser. 54. 23 p., 10 fig. 1920.

1157. MUNSON, K. W., AND E. W. WHITE. Raspberry culture. British Columbia Dept. Agric. Circ. New Hort. Ser. 55. 15 p., 7 fig. 1920.

1158. NANOT, JULES. Reconstitution des plantations fruitières dans les régions libérées et évaluation des dommages causées aux arbres. [Restoration of orchards in the liberated regions with an estimate of the damage done to the trees.] 84 p., 50 fig. Miason: Paris, 1920.

1159. ORB, G. The story of the prune. Sci. Amer. 124: 52. 3 fig. 1921.

1160. PRAY, LUIS. Plantemos frutillares industriales. [Commercial strawberry plantings.] El Agricultor [Santiago, Chile] 5: 5-7. 2 fig. 1920.

1161. PRAYAG, S. H. The influence of stock and scion and their relation to one another. Agric. Jour. India 15: 533-542. 3 fig. 1920.—Some stocks have a distinct preference for particular scions while others do not. The stock plays an important part in influencing the habit of growth and hardiness of the scion. The formation, at the point of union, of big knotty excrescences in plants whose rate of growth is not similar, considerably checks growth. Grafted plants composed of parts having different periods of rest fail to grow into big plants. The scion has a preponderating influence in determining the character of the fruit produced by it. The position of the mature scion at the end of a branch in a large tree influences the flowering. It is undesirable to insert scions of more than one variety on the branches of a single stock. Grafting between different genera, though succeeding in some cases, has not been found successful in the mango.—*J. J. Skinner.*

1162. RINGELMANN, M. Chauffage des serres au bois. [Heating greenhouses with wood.] Revue Hort. 92: 180-181. Fig. 62-63. 1920.—A method is detailed of making and fitting special grates for the burning of wood in furnaces intended for the use of coal.—*E. J. Kraus.*

1163. RIVIÈRE, GUSTAVE, ET GABRIEL BAILHACHE. Observations sur la composition de l'atmosphère d'un fruitier dans lequel on conserve des pommes de Caville Blanc. [Observations on the composition of the atmosphere of a fruit store where apples are kept.] Jour. Soc. Nation. Hort. France 21: 151-153, 202-204, 234-235. 1920.—The writers state that after apples are mature, during the period they are kept in the fruit store or storage room, they lose their green color, and, due to chemical reactions in the apple itself, they give off CO₂ and take in oxygen whether they be in the light or in partial or total darkness. Due to this giving off of CO₂ the atmosphere in the fruit store becomes considerably modified and it is the belief of the writers that this must have some effect on the fruit itself. Analyses were made of the air of a fruit storage room and it was found to contain a large amount of CO₂. The writers conclude that CO₂ must be an important factor in the keeping of fruits, since in experiments with pears, covering several years small quantities of CO₂ retarded maturity and arrested it completely when in excess. Results are given of temperature and humidity studies in a fruit storage room. When the temperature was the highest, 10°C., the humidity was also the highest, 94 per cent of saturation. At the lowest temperature, 2°C., the humidity was 88. It is stated that this high humidity probably accounts for apples keeping for a long time with only a slight withering or wrinkling of the skin. The writers conclude that the temperature ought to be maintained between 2 and 4°C., and add that this can be accomplished only under refrigeration.—*H. C. Thompson.*

1164. ROBERTSON, W. H. Currant and gooseberry culture. British Columbia Dept. Agric. Circ. New Hort. Ser. 61. 8 p. 1921.

1165. SHRIVASTAVA, K. P. A preliminary note on the improvement of oranges. *Agric. Jour. India* 15: 508-515. 6 fig. 1920.—A general discussion is given of pruning, irrigation, and manuring. Experiments are being made with organic manures and mineral fertilizers. There is a distinct improvement in the vegetation, growth, and fruiting of the trees resulting from the use of nitrogenous manures. Mohwa (*Bassia latifolia*) refuse is producing best results, followed by castor cake, cattle dung, and calcium nitrate. The mineral fertilizers have as yet produced no noticeable effect.—J. J. Skinner.

1166. SIEBERT, A. Kriegswirtschaftliche Betätigung des Palmengartens. [Cooperation of the Palm Garden in war activities.] *Ber. Senckenberg. Naturf. Ges. Frankfurt a. M.* 49: 83-84. 1919.—The activities of the Palm Garden at Frankfurt in helping to increase the production of vegetable foods in Germany are here reported. The propagation of potatoes by means of cutting is described, and the cultivation of certain vegetables which had previously been imported has proved practicable.—A. W. Evans.

1167. SKERRETT, R. G. California's citrus fruit industry. *Sci. Amer. Monthly* 2: 212-216. 11 fig. 1920.

1168. WEST, FRANK L., AND N. E. EDLEFSEN. Freezing of fruit buds. *Jour. Agric. Res.* 20: 655-662. Pl. 75. 1921.—Thermometers were hung in tree tops and temperature records kept for all spring nights with freezing temperatures. Flowers were also frozen in chambers and records kept. Tables are given showing the percentage of blossoms of different ages killed by different temperatures.—W. H. Chandler.

FLORICULTURE AND ORNAMENTAL HORTICULTURE

1169. ANONYMOUS. A new Polygonum. *Florists' Exchange* 50: 1017. 1920.—*P. campanulatum* attracted much attention and received an award of merit when recently shown in London. It is a plant of bushy growth, 2½ ft. high, with distinctly bell-like flowers, and colored much like *Kalmia latifolia*. It is probably a plant of great promise, a possible acquisition for pot work.—L. A. Minns.

1170. ANONYMOUS. Eupatoriums as a florists' flower. *Florists' Exchange* 50: 873. 1920.—Note is made of the use of a *Eupatorium* in one of the florists' stores of Boston. The writer then lists useful Eupatoriums for garden and greenhouse, some of which are little known and seldom seen. The list includes, of hardy herbaceous kinds, *E. perfoliatum*, *E. agertoides*, and *E. Fraseri*, all white, and *E. coelestinum*, one of the best blue perennials; while for growing under glass there are *E. Purpusi*, sweetscented, pink, and *E. conspicuum*, shrub-like, a good winter bloomer and summer bedder.—L. A. Minns.

1171. ANONYMOUS. New plants. *Florists' Exchange* 50: 863. 1920.—Attention is called to new plants recently exhibited in London, among which were several named varieties of hardy asters; *Helianthus*, "Monarch," of the *rigidus* section, having 3 or 4 rows of ray florets and described as magnificent; and a new *Dahlia*, "Ada Finch," described as clematis-flowered in form.—L. A. Minns.

1172. BAUER, G. *Le Leontopodium alpinum* Cass; culture sur rocailles. [The culture of *Leontopodium alpinum* Cass., in rockeries.] *Revue Hort.* 92: 165-166. Fig. 58-59. 1920.

1173. BELLAIR, G.-A. ET P. Parcs et jardins. [Parks and gardens.] 382 p., 226 fig. J.-B. Baillière et Fils: Paris, 1919.

1174. BOYNTON, KENNETH R. *Eupatorium coelestinum*. *Addisonia* 4: 39-40. Pl. 140 (colored). 1919.—*Eupatorium coelestinum* L. is illustrated and redescribed. The species is a native of eastern U. S. A. and Cuba.—T. J. Fitzpatrick.

1175. BOYNTON, KENNETH R. *Sedum spectabile*. Addisonia 4: 3. Pl. 122 (colored). 1919.—This showy *Sedum*, first characterized by Boreau in 1866, although propagated by horticulturists since about 1860, is described. The presumed nativity is Japan.—T. J. Fitzpatrick.

1176. BROWN, W. ROBERTSON. The frash (*Tamarix articulata*). Agric. Jour. India 14: 758-761. Pl. 2. 1919.—The article discusses the use of the "Frash" as a windbreak, or as a hedge for dividing estates, etc. The tree is well depicted in the illustrations.—J. J. Skinner.

1177. KÖCK, G. Vergleichende Bodentemperaturmessungen. [Comparative soil-temperature measurements.] Zeitschr. Landw. Versuchsw. Deutschösterreich 23: 69-87. 1920.—Comparative soil temperatures were taken at a depth of 30 cm. near the north, south, east, and west walls of a trellis garden. The walls were 2 meters high and peach trees had been trained against them. Temperatures were taken each day at 7 a.m., 12 m. and 6 p.m. for 1 year. Average daily and monthly temperatures, maxima, minima, etc., are given. Air temperatures were also taken for comparison. Taking the whole year into consideration the warmest situation for trellis-plants would be the south side of the wall, the east, north, and west sides following in the order named. From a temperature standpoint, the north and west situations are closely related as also are the east and south situations. Especially in December, January, and February does the north side surpass the south and east sides in temperature, and it is also considerably higher than the west side. In the other months, the west side is somewhat higher in temperature than the north side and the south and east sides surpass both.—John W. Roberts.

1178. MACKENZIE, KENNETH K. *Eupatorium maculatum* L. Addisonia 4: 23-24. Pl. 132 (colored). 1919.—The author gives a description, with notes, of this the most conspicuous of the joe-pye weeds, a native of northeastern North America.—T. J. Fitzpatrick.

1179. NASH, GEORGE V. *Celastrus articulatus* Thunb. Addisonia 4: 9-10. Pl. 125 (colored). 1919.—A hardy, shrubby bittersweet, native of China and Japan, frequently cultivated, rather closely related to *Celastrus scandens* of the United States.—T. J. Fitzpatrick.

1180. NASH, GEORGE V. *Crataegus macrosperma*. Addisonia 4: 35. Pl. 133 (colored). 1919.—A variable species, ranging throughout northeastern United States and Nova Scotia.—T. J. Fitzpatrick.

1181. NASH, GEORGE V. *Crataegus succulenta*. Addisonia 4: 5-6. Pl. 123 (colored). 1919.—A species of the *macracanthae* group, native of Nova Scotia and northeastern United States, possessing economic possibilities.—T. J. Fitzpatrick.

1182. NASH, GEORGE V. *Forsythia Fortunei*. Addisonia 4: 17-18. Pl. 129 (colored). 1919.—An early blooming shrub of the olive family, a native of China, frequent in cultivation.—T. J. Fitzpatrick.

1183. NASH, GEORGE V. *Malus Halliana*. Addisonia 4: 27. Pl. 134 (colored). 1919.—A decorative shrub, native of western China, introduced into the United States in about 1863, by Dr. G. R. Hall.—T. J. Fitzpatrick.

1184. NASH, GEORGE V. *Oxydendrum arboreum*. Addisonia 4: 37-38. Pl. 139 (colored). 1919.—A species of the monotypic genus, native of southeastern United States, introduced into England and elsewhere.—T. J. Fitzpatrick.

1185. PARTINGTON, J. B. Rose culture. British Columbia Dept. Agric. Circ. New Hort. Ser. 59. 5 p., 2 fig. 1920.

1186. PENNELL, FRANCIS W. *Penstemon calycosus*. Addisonia 4: 31-32. Pl. 136 (colored). 1919.—A showy species, growing on shaded calcareous soil, native of the south-eastern Mississippi Valley.—T. J. Fitzpatrick.

1187. PENNELL, FRANCIS W. *Penstemon digitalis*. Addisonia 4: 19-20. Pl. 130 (colored). 1919.—A lengthy description of the species is given, with comments on the genus. The species is a native of southwestern Mississippi Valley, introduced eastward.—T. J. Fitzpatrick.

1188. PROSCHOWSKY, A. R. *Albizzia lophanta* Benth., var. *speciosa*. Revue Hort. 92: 174-175. 1920.—A beautiful tree of rapid growth, readily propagated from seed and well adapted to dry situations, this plant should be grown abundantly as a decorative perennial in the milder climates and as an annual in the more northern locations.—E. J. Kraus.

1189. ROLET, A. Le froid artificiel régulateur des marchés dans le commerce des fleurs coupées. [Refrigeration a regulator of the cut flower trade.] Revue Hort. 92: 175-176. 1920.—An argument for the installation of refrigeration plants as community enterprises at the points of origin of the crops or at the market centers.—E. J. Kraus.

1190. SMALL, JOHN K. *Chamaecrista Deeringiana*. Addisonia 4: 1-2. Pl. 121 (colored). 1919.—A full description is given of this perennial species, a native of southern Florida, with notes on the related species *C. brachiata*. *C. Deeringiana* is readily distinguishable by its stout, elongated, horizontal rootstock which is stated to be quite an exception in this genus.—T. J. Fitzpatrick.

1191. SMALL, JOHN K. *Heliotropium Leavenworthii* Torr. Addisonia 4: 29-30. Pl. 135 (colored). 1919.—A lengthy description with comment is included of this species, which occurs on the edges of the Everglades and in the adjacent pinelands of southern Florida. T. J. Fitzpatrick.

1192. SMALL, JOHN K. *Heliotropium polyphyllum* Lehm. Addisonia 4: 25-26. Pl. 133 (colored). 1919.—A full description with comments is given. The species is a native of southern Florida and tropical America.—T. J. Fitzpatrick.

1193. SMALL, JOHN K. *Ipomoea tenuissima*. Addisonia 4: 15-16. Pl. 123 (colored). 1919.—A full description is given of this pink morning-glory, a native of the pine woods of southern Florida, Cuba, and Hispaniola.—T. J. Fitzpatrick.

1194. SMALL, JOHN K. *Limodorum Simpsonii*. Addisonia 4: 7-8. Pl. 124 (colored). 1919.—A full description is given of this terrestrial orchid, a native of the Everglades of Florida, found also in the Bahamas and Cuba.—T. J. Fitzpatrick.

1195. SMALL, JOHN K. *Mentzelia floridana*. Addisonia 4: 13-14. Pl. 127 (colored). 1919.—A species of the Loasa family, found about hammocks in Florida and the Bahamas.—T. J. Fitzpatrick.

1196. SMALL, JOHN K. *Okenia hypogaea*. Addisonia 4: 11-12. Pl. 126 (colored). 1919.—A species of the four-o'clock family, originally collected on sand hills near Vera Cruz, Mexico, since found in southern Florida. This species is the type of the genus.—T. J. Fitzpatrick.

1197. SMALL, JOHN K. *Rhabbadenia corallicola*. Addisonia 4: 33-34. Pl. 137 (colored). 1919.—An erect or diffuse shrub of the family Apocynaceae, native of southern Florida, occurring in the pinelands, and blooming throughout the year. A full description is given with notes and comment.—T. J. Fitzpatrick.

1198. TURBAT, E. Deux belles roses. [Two good roses.] *Revue Hort.* 92:178. 1 *pl* (colored). 1920.—The variety Willowmere (Pernet-Ducher 1913) is the result of a cross between an unnamed variety and Lyon Rose, which latter it much resembles but is an improvement in being more hardy and floriferous; Arthur R. Goodwin (Pernet-Ducher 1909) is the offspring of a seedling crossed with Soleil d'Or, reddish orange copper in color and vigorous. Both are suited for breeding or for use as cut-flowers.—*E. J. Kraus.*

1199. VACHEROT, M. Les Oeillets a grandes fleurs. [Large flowered carnations.] *Revue Hort.* 92:176-177. *Fig.* 60-61. 1920.—Notes relative to recent improvement in the quality of carnations, particularly of the American type, together with brief cultural directions.—*E. J. Kraus.*

HORTICULTURE PRODUCTS

1200. ANONYMOUS. [Rev. of: KNAPP, A. W. Cocoa and chocolate: their history from plantation to consumer. *xii + 210 p., illus.* Chapman & Hall: London, 1920.] *Sci. Prog.* [London] 15: 320-321. 1920.

1201. ANONYMOUS. The palm sugar industry in Bengal. *Louisiana Planter and Sugar Manufacturer* 65: 3-4. 1920.—The palm sugar industry is very old but is declining at present. The Phoenix and Borassus palms are the ones chiefly used. Bengal produced 10,000 tons of palm sugar in 1913-14.—*C. W. Edgerton.*

1202. BURNS, W. The drying of bananas. *Agric. Jour. India* 15: 166-173. 1920.—The investigation shows that sun heat is sufficient for the drying of bananas and that all varieties can be successfully dried. For a good color a card board screen should be used during the last few days of drying. The product should be stored in air tight tins. The apparatus used is a simple lattice tray which can be closed with covers. Fully ripe fruit free from skin should be used.—*J. J. Skinner.*

1203. PARIS, G. L'industria delle ciliege bianche. [White cherry industry.] *Staz. Sperim. Agrarie Ital.* 53: 187-227. 1920.—This is a study of the commercial phases of the industry and of the scientific principles underlying it.—*A. Bonazzi.*

1204. PATWARDHAM, V. G. Gur-making from the juice of the date-palm (*Phoenix sylvestris*) in the Thama District of the Bombay Presidency. *Agric. Jour. India* 15: 525-532. 1920.—Experiments were made to determine the best juice suitable for gur making and to get gur of solid crystalline consistency. Juice treated with formalin gave solid gur of good grain; chloroform likewise gave solid gur, but with no grain. Juice treated with acetic acid produced gur which was soft and sticky, of good light color, but not of good taste. Tartaric acid added to juice gave a solid crystalline gur, with no change in color. The data are presented in tabular form, showing the effect of different processes and varying amounts of acid on the qualities of gur.—*J. J. Skinner.*

1205. PRAY, LUIS. Practicas generales sobre la elaboracion de los vinos. [Practical methods of making wines.] *El Agricultor* [Santiago, Chile] 5: 53-57. 1920.—Discusses collecting, milling, sulphitation, fermentation, and other steps in the process of making wine.—*John A. Stevenson.*

MORPHOLOGY, ANATOMY, AND HISTOLOGY OF VASCULAR PLANTS

E. W. SINNOTT, *Editor*

(See also in this issue Entries 779, 788, 943, 1013, 1019, 1021, 1041, 1044, 1085, 1342, 1367, 1374, 1429, 1494)

1206. BELYEA, H. C. Ray tracheid structure in second growth *Sequoia Washingtoniana*. Bot. Gaz. 68: 467-476. 5 fig. 1919.—Second growth trunks of *Sequoia washingtoniana* are wanting in true ray tracheids; instead, vertical wood tracheids bend at the ray, and are contiguous thereto for some little distance. Communicating pits develop in these contiguous walls of rays and tracheids. These modified vertical tracheids are believed to function as ray tracheids.—H. C. Cowles.

1207. BOUYGUES, H. Le meristeme terminal de la tige et sa division en regions. [The terminal meristem of the stem and its division into zones.] Compt. Rend. Acad. Sci. Paris 171: 926-927. 1920.—Two regions of the meristem, a prevascular and a cortical zone, are distinguished.—C. H. Farr.

1208. BUGNON, P. Sur l'emploi d'encre commerciales en histologie végétale. [On the use of commercial inks in vegetable histology.] Compt. Rend. Acad. Sci. Paris 169: 1051-1054. 1919.—Commercial inks having a base of tannin and iron sulphate have been successfully employed in the staining of pectin-cellulose membranes, giving a blue which is adapted to the use of a counter stain of red, brown, or green. Inks having log-wood (haematoxylin) as a base have also been shown to be satisfactory for certain purposes. Formulas for the preparation of ink stains with various other stains are given.—V. H. Young.

1209. DETJEN, L. R. Peloria in *Viola primulaefolia* Linn. Torreya 20: 107-116. Fig. 1-11. 1920.—Peloria in European species of *Viola* (*V. odorata* and *V. hirta*) has been known since 1775. Two forms are recognized, the incomplete and the complete. A plant of *V. primulaefolia* was discovered at West Raleigh, North Carolina, producing flowers not only with all the various forms of peloria, but with a general reduction and tendency toward numerical uniformity in all the floral whorls. In this plant the flower was not only perfectly regular but all the parts were in fours. Other plants collected at the same station possessed from 1 to 4 saccate petals, and showed variations in the number and character of parts in each floral whorl. Plants grown from seed of these peloric plants produce peloric flowers, which remain uniform under great differences of environment, and such plants apparently breed true to type both vegetatively and sexually.—J. C. Nelson.

1210. GATIN, V. C. Recherches anatomiques sur le pedoncule et la fleur des Liliacées. [An anatomical study of the peduncle and flower of the Liliaceae.] Rev. Gén. Bot. 32: 460-528. Fig. 32-55. 1920.—A continuation of the anatomical study previously reported. In this number the 10th tribe of the Lilioideae is covered, together with the tribes of the sub-family Asphodeloideae and 5 tribes of the sub-family Asparagoideae.—J. C. Gilman.

1211. LAND, W. J. G. Botany of the living plant. [Rev. of: BOWER, F. O. Botany of the living plant. x + 580 p., 447 fig. Macmillan: London, 1919 (see Bot. Absts. 4, Entries 526, 1394; 7, Entry 1608).] Bot. Gaz. 68: 478-479. 1919.—The book is highly praised for its embodiment of long years of first-hand contact with material and of long teaching experience. The gymnosperms are felt to be inadequately treated, and minor criticisms are noted in the treatment of the liverworts.—H. C. Cowles.

1212. SCHAFFNER, JOHN H. A remarkable bud sport of *Pandanus* [utilis]. Jour. Heredity 10: 376-378. Fig. 14. 1919.—The bud sport (mutation) shows a two-ranked arrangement of the leaves without spiral twist as opposed to the normal three-ranked arrangement with spiral twist. A progressive phyletic arrangement is suggested for the related genera *Pandanus*, *Sparganium*, and *Typha*.—J. R. Schramm.

1213. SCHERTZ, F. M. Early development of floral organs and embryonic structures of *Scrophularia marylandica*. Bot. Gaz. 68: 441-450. 3 pl. 1919.—The order of development of floral parts is calyx, stamens, corolla, pistil, the stamens and corolla arising from a common outgrowth. The megaspore archesporium consists of 1 hypodermal cell, functioning as a megaspore mother cell, which gives rise to an axial row of 4 potential megaspores. The embryo sac comes from the chalazal one, the others degenerating. The mature sac has 1 egg, 2 large synergids, an endosperm nucleus, and 3 antipodal nuclei which soon degenerate. A secondary endosperm nucleus was observed, also the fusion of polar nuclei. The 1st division of the fertilized egg is transverse, and is followed by a longitudinal division of the chalazal nucleus. The nucellus consists of a single cell layer around the megaspore. A 1-celled tapetal layer develops around the sac, forming as the megaspore mother cell divides. Two prominent haustoria form at the chalazal end of the sac, and 4 weaker ones at the micropylar end. There is a single thick integument. Before the egg divides, endosperm cells form, separating the egg from the micropylar end. There is a short suspensor, which disappears at embryo maturity. In the seed the embryo is surrounded by thick endosperm cells gorged with food.—F. M. Schertz.

1214. SCHÜEPP, OTTO. Beiträge zur Entwicklungsgeschichte der Stockausschläge. [Concerning the developmental history of stem shoots.] Vierteljahrsschr. Naturforsch. Ges. Zurich 63: 106-115. 1918.—The vegetative point of a lateral shoot arises as a small meristem-complex and begins developing leaves long before it has attained the size and structure of the mother vegetative point.—John H. Schaffner.

1215. SCHÜEPP, OTTO. Zur Entwicklungsgeschichte des Blattes von *Acer pseudoplatanus* L. [Developmental history of the leaf of *Acer pseudoplatanus* L.] Vierteljahrsschr. Naturforsch. Ges. Zurich 63: 99-105. 1918.—An outline of the origin of the various leaf tissues from the meristem.—John H. Schaffner.

1216. SOUÈGES, RENÉ. Embryogenie des Urticacées. Développement de l'embryon chez l'*Urtica pilulifera* L. [The embryology of the Urticaceae. The development of the embryo of *Urtica pilulifera*.] Compt. Rend. Acad. Sci. Paris 171: 1009-1011. 1920.—A scheme is presented for tabulating the development of the embryo of angiosperms, showing the parts from which each portion of the embryo is derived and the separation of the various primordia in the successive divisions. The development of the embryo of *Urtica* is found to follow in general that of *Senecio vulgaris*.—C. H. Farr.

1217. THODAY, M. G. Anatomy of the ovule and seed of *Gnetum gnemon* with notes on *Gnetum funiculare*. Ann. Botany 35: 37-54. Pl. 1, fig. 1-5. 1921.—The changes which take place in the envelopes of the ovule of *G. gnemon* during development are described. The micropylar tube which is a continuation of the innermost of the 3 envelopes becomes closed. A flange-like outgrowth of this tube becomes fused at the top with the outermost envelope and at the bottom projects over the middle envelope. The growth of the outer covering carries the closed micropylar tube upwards causing its apical region to break away from the base. This upper region thus forms a sort of stopper which is carried still further upwards. The basal part then projects as a sort of beak through the opening at the top of the middle covering. The conditions here described are compared with those in Bennettitales.—W. P. Thompson.

1218. THOMPSON, W. P. Companion cells in bast of *Gnetum* and angiosperms. Bot. Gaz. 68: 451-459. 7 fig. 1919.—*Gnetum* has companion cells resembling those of angiosperms in size, structure, and location, but not in development; in *Gnetum* sieve tubes and companion cells are produced from different rows of cambial cells, instead of from 2 successive cells in a single row. This is thought to indicate parallel evolution rather than genetic relationship.—H. C. Cowles.

1219. WILLIAMSON, H. S. A new method of preparing sections of hard vegetable structures. Ann. Botany 35: 139. 1921.—Hard materials to be sectioned are transferred from water to

pure acetone and then to a 12 per cent solution of cellulose acetate in acetone. By this method they are not only imbedded but also softened. Woods such as oak or beech are sufficiently softened for sectioning after 6 days in the solution.—*W. P. Thompson.*

1220. WISSELINGH, C. VAN. Bijdragen tot de Kennis van de Zaadhuid. Achtste bijdrage: Over de Zaadhuid bij de orde der Centrospermae. [Contribution to a knowledge of the seed-coat. Eighth contribution: The seed-coat of the Centrospermae.] Pharm. Weekbl. 57: 1193–1211. Pl. 1, fig. 10. 1920.—In the campylotropic ovule of the Centrospermae 3 cuticles can be distinguished, 1 on the epidermis, 1 between the 2 integuments, and 1 between the innermost integument and the nucellus. During the development of the ovule into the seed in some cases (Caryophyllaceae) the cuticle on the epidermis disappears; in other cases (*Beta vulgaris*, *Amaranthus caudatus*, *Portulaca grandiflora*) the cuticle between the 2 integuments is lost, either partly or altogether. The cuticle between the seed-coat and the nucellus remains and becomes rather thick. In the chalaza a cork-tissue is developed, which borders the thick cuticle between the seed-coat and the nucellus but which differs from other chalaza cork tissues in that the cork-cells are thickened at the corners (*Beta vulgaris*) or in that the cell-walls are covered with a cutin-like substance.—*H. Engelhardt.*

MORPHOLOGY AND TAXONOMY OF ALGAE

E. N. TRANSEAU, *Editor*

(See also in this issue Entries 932, 933, 1291, 1360)

1221. BRISTOL, B. MURIEL. On a Malay form of *Chlorococcum humicola* (Näg.), Rabenh. Jour. Linn. Soc. Bot. London 44: 473–482. Pl. 17–18. 1920.—The author describes an alga obtained by culture from a sample of soil from Kuala Lumpur that had been dry for two years. Reproduction by zoospores, which may also act as gametes, was observed. Aplanospores are formed which germinate and produce a palmella-stage, and these cells produce the usual vegetative cells directly, or indirectly by means of zoospores. In dried soil samples *Chlorococcum* has been known to retain its vitality more than 70 years.—*E. N. Transeau.*

1222. BRISTOL, B. MURIEL. A review of the genus *Chlorochytrium*, Cohn. Jour. Linn. Soc. Bot. London 45: 1–28. Pl. 1–3, fig. 1. 1920.—In continuation of the work of G. S. West in submerging 6 genera into the genus *Chlorochytrium*, this paper contains a critical discussion of the present limits of the genus and the criteria that may be used to define species. As a result of further study of the morphology of these forms, 10 well-defined and 3 doubtful forms are included in the genus. The recognized species are: *Chlorochytrium Lemnae* Cohn; *C. bienne* (Klebs) G. S. West; *C. paradoxum* (Klebs) G. S. West; *C. Facciolaee* (Borzi) Bristol, and var. *minor* (Borzi) Bristol; *C. grande* Bristol; *C. Limnanthemum* (D.D. Cunningh.) G. S. West; *C. inclusum* Kjellman, and var. *dermatocolax* (Reinke) Bristol; *C. Sarcophyci* (Whitting) G. S. West; *C. Cohnii* E. P. Wright, and var. *Porphyrae* (Gardner) Bristol; and *C. Moorei* Gardner. The doubtful forms are *C. laetum* Schroeter, *C. viride* Schroeter, and *C. rubrum* (Schroeter) Freeman.—*E. N. Transeau.*

1223. BRITTON, NATHANIEL LORD, AND CHARLES FREDERICK MILLSPAUGH. The Bahama Flora. Roy. Soc., viii + 695 p. Published by the authors: New York, June 26, 1920.—See Bot. Absts. 7, Entry 1429.

1224. CONRAD, W. Contributions a l'etude des Chrysomonadines. [Contributions to the study of the Chrysomonads.] Bull. Acad. Roy. Belgique, Cl. Sci. 1920⁴⁻⁵: 167–189. 11 fig. 1920.—The author takes up first *Synura Uvella* Ehr., and brings together his own observations and those of others on the cell, its division, and the formation of colonies. *Thallochrysis Pascheri* is described as a new genus and species, the type of a new family, the Thallochrysidaceae. The taxonomic characters of *Chrysapsis sphagnorum* n. sp. and other indigenous species of *Chrysapsis* are given.—*Henri Micheels.*

1225. COSTANTIN, J. Travaux recents sur les Thallophytes. [Recent work on the Thallophytes.] Ann. Sci. Nat. Bot. X, 1: xxx-xxxvi. 1919.—The author calls attention to studies on Laminarias, mentioning especially C. SAUVAGEAU's contributions to knowledge of their life cycle. Reproductive bodies borne along median line of blades are asexual (zoospores) and are said to give rise on germination to minute filamentous sexual thalli which are dioecious. In *Sacchorhiza* the female thallus is obliterated and the egg is the protoplasm of the zoospore made ready for fertilization. Actual observation of fusion of gametes is not reported. Sauvageau's cultural methods are briefly described. Economic possibilities of marine agriculture are dwelt upon.—James P. Kelly.

1226. FISCHER, L. Tabellen zur Bestimmung einer Auswahl von Thallophyten und Bryophyten. [Keys for the determination of a selected group of thallophytes and bryophytes.] 60 p. Bern, 1918.

1227. FORTI, ACHILLE. Elenco preliminare della flora pelagica del seno di Quarto dei Mille presso Genova. [Preliminary catalogue of the pelagic flora of the Quarto dei Mille Bay, near Genoa.] La Nuova Notarisia 31: 65-72. 1920.—The paper consists of a list of 235 species of pelagic organisms, representing the groups Cystoflagellata (1), Dinoflagellata (Peridiniales) (123), Acontae (Bacillariales) (101), Silicoflagellata (3), Coccospheerales (1), and Chlorophyceae (6).—Marshall A. Howe.

1228. FRITSCH, F. E., AND E. STEVENS. Contributions to our knowledge of the freshwater algae of Africa: 3. Freshwater algae (exclusive of diatoms) mainly from the Transkei Territories, Cape Colony. Trans. Roy. Soc. South Africa 9: 1-72. Fig. 1-29. 1921.—An annotated list of algae collected in South Africa enumerating 146 species belonging to 63 genera, including Isokontae, Heterokontae, Cyanophyceae, Florideae, and Flagellata. Six new species, a new subspecies, and 13 new varieties are described. The new species are *Enteromorpha basiramosa*, *Closterium pegleri*, *C. pseudolibellula*, *Euastrum submontanum*, *E. simpliciforme*, and *Spirogyra subreticulata*.—E. N. Transeau.

1229. GARD, MEDERIC. Biologie d'une nouvelle espece d'Euglene (*Euglena limosa* nov. spec.). [Biology of a new species of *Euglena* (*Euglena limosa* nov. spec.).] Compt. Rend. Acad. Sci. Paris 169: 1423-1425. 1919.—A brief description of the morphological characteristics and behavior of a new species of *Euglena*, *E. limosa*, and a discussion of the work of ROSE BRACHER [Ann. Bot. 33: 93-108. 1919] on *Euglena deses*, Ehrenberg.—V. H. Young

1230. GHOSE, S. L. *Campylonema lahorensis*, a new member of Scytonemaceae. New Phytol. 19: 35-39. Fig. 1-6. 1920.—A blue-green alga from Lahore, formerly referred by the author to *Tolypothrix arenophila* W. and G. S. West, is here shown to be distinct and is described under the name given.—I. F. Lewis.

1231. GHOSE, S. L. The Myxophyceae of Lahore. Jour. Indian Bot. 1: 8-13. 1919.—An annotated list of blue-green algae of Lahore, India.—E. N. Transeau.

1232. GROVE, W. B., B. MURIEL BRISTOL, AND NELLIE CARTER. The flagellates and algae of the district around Birmingham. Jour. Botany 58: Suppl. 3. 1-55. 1920.—The extensive list making up the bulk of this paper was compiled almost exclusively from records made by the late G. S. WEST during the last 13 years of his life. The summary of species listed is as follows: Flagellates, 33; Myxophyceae, 83; Peridineae, 6; Bacillariae, 155; Chlorophyceae, 444; and Rhodophyceae, 6. A bibliography is appended.—K. M. Wiegand.

1233. HODGETTS, WILLIAM J. A new species of *Spirogyra*. Ann. Botany 34: 519-524. Pl. 22, 5 fig. 1920.—A description of *Spirogyra colligata* is presented. The species is remarkable in presenting a new form of cross walls between adjacent cells in the filaments. The cross walls are plane but possess an extra layer which recalls the so-called H-shaped pieces in the walls of *Microspora*. Conjugation may take place through the end walls as well as by the usual methods known for other species of the genus.—E. N. Transeau.

1234. HOWE, MARSHALL A. *Algae*, in Britton's "Flora of Bermuda," p. 489-540. 1918.—See Bot. Absts. 8, Entry 687.

1235. HOYT, W. D. *Marine algae of Beaufort, N. C., and adjacent regions.* Bull. U. S. Bur. Fisheries 36: 367-556. Pl. 84-119, 47 fig. 1920.—Following a general account of the region, the local distribution, the ecological factors, the seasonal distribution, and methods of collecting and preserving algae are discussed. Most of the bulletin is given over to a systematic account of the 133 species and varieties found. Of these, 10 are Myxophyceae, 25 Chlorophyceae, 27 Phaeophyceae, and 71 Rhodophyceae. Descriptions, critical notes, and keys are given for all the species included. The plates are largely photographs. New species described are *Nitophyllum medium* and *Streblonema invisibile*.—E. N. Transeau.

1236. LEMOINE, MME. PAUL [LEMOINE, MARIE]. *Botanische Ergebnisse der Schwedischen Expedition nach Patagonien und dem Feuerlande 1907-1909.* VII. Les Melobesiées. [Botanical results of the Swedish expedition to Patagonia and Tierra del Fuego 1907-1909. VII. The Melobesiaceae.] K. Svenska Vetenskapsakad. Handl. 61⁴: 1-17. Pl. 1. 1920.—The author discusses and describes specimens collected by Dr. CARL SKOTTSBERG. Five species are attributed to the island of Chiloe, 1 to the island of Huafo, 2 to Juan Fernandez, 6 to Tierra del Fuego, 1 to the island of Atalaya, and 6 to the Falkland Islands. Six species, *Lithothamnium paucisporum*, *L. Caroli*, *L. (?) Skottsbergii*, *Lithophyllum (?) almanense*, *L. fernandezianum*, and *L. atalayense*, are described as new.—Marshall A. Howe.

1237. LEWIS, IVEY F., AND CONWAY ZIRKLE. *Cytology and systematic position of Porphyridium cruentum Naegeli.* Amer. Jour. Bot. 7: 333-340. 2 pl. 1920.—The authors give an account of the somewhat tangled taxonomic history of this species, and discuss briefly the conflicting descriptions of it which have been presented by various writers. From the results of their own observations, the authors suggest that previous workers may have studied different growth states of the same species rather than different species. The cells are surrounded by jelly and are usually borne on gelatinous stalks. The chromatophore is star-shaped in resting cells, amoeboid in growing ones. The pyrenoid is distinct, easily stainable and centrally located, and is generally spheroidal. In the resting stage there is a single eccentric globule of chromatin homologous to a nucleus or nucleolus. Nuclear division is crudely mitotic. The authors suggest that for the present *Porphyridium* should be kept in the Bangiaceae.—E. W. Sinnott.

1238. LINDEMANN, E. *Untersuchungen über Süßwasserperidineen und ihre Variationsformen II.* [Investigations of fresh-water Peridineae and their variations.] Arch. Naturgesch. Abt. A 84: 121-194. Fig. 1-200. 1918 [1920].—A continuation of work reported under the same title (Arch. Protistenk. 39: 209-262. Pl. 17, fig. 1-144. 1919). The author discusses the grouping of the Peridineae and describes his method of distinguishing and designating forms, subvarieties, subspecies, and varieties. Descriptions are given of 17 forms, 3 subvarieties, 31 varieties, and 14 species. He also discusses the distribution of members of the group with reference to season and composition of the water, and their association with other plankton constituents. Additional notes are given of stations for 27 species, 3 varieties, and 3 forms.—C. E. Allen.

1239. LUCAS, A. H. S. *Algae of Commonwealth Bay.* Australasian Antarctic Expedition, 1911-14, Sci. Rept. Ser. C. 7²: 18 p., 9 pl. 1919.—An account of the algae of the antarctic region with description of two new species: *Chaetomorpha Mawsoni* and *Iridaea Mawsoni*. Victoria Land and Commonwealth Bay are each credited with 14 species of which 8 are common.—E. N. Transeau.

1240. LYLE, LILIAN. *The marine algae of Guernsey.* Jour. Botany 58: Suppl. 2. 1-53. 1920.—The present list and notes, both ecological and taxonomic, were based on collections and field studies made in 1911, 1912, and 1914. In all, 250 species and 78 varieties and forms are listed from the island. *Chantransia Lorrain-Smithiae* Lyle and *Gelidium latifolium* Born.

var. *Hystrix*, forma *condensata* Holmes are described as new. Descriptions of some less well known species are given. In the section on ecology the author discusses the algal ecology of Guernsey under 7 headings: (1) Physical position of the island; (2) tides; (3) currents; (4) nature of the substratum; (5) configuration of the coast; (6) salinity; and (7) temperature. Three main regions are recognized: Upper littoral, middle littoral and sub-littoral. These are subdivided into zones to the extent of 15 in all. The zones are mostly named from their most characteristic plant. A comparison of the Guernsey algal flora with that of the neighboring coast is made. An account of the uses made of algae concludes the paper.—K. M. Wiegand.

1241. MARKLE, M. S. Some abnormalities in plant structure. Proc. Indiana Acad. Sci. 1918: 117-124. Fig. 1-9. 1920.—See Bot. Absts. 7, Entry 1066.

1242. PAULSON, R., AND S. HASTINGS. The relation between the alga and fungus of a lichen. Jour. Linn. Soc. London Bot. 44: 497-506. Pl. 21-22. 1920.—See Bot. Absts. 7, Entry 1994.

1243. PEASE, VINNIE A. Taxonomy and morphology of the ligulate species of the genus *Desmarestia*. Publ. Puget Sound Biol. Sta. 2: 313-367. Pl. 54-63. 1920.—One new species is erected, *Desmarestia herbacea*; and another announced, *D. latissima* Setchell & Gardner. There is a detailed discussion of the limits of these, and their relation to *D. tabacoides* Okamura; also a detailed discussion of the limits and history of *D. ligulata* (Lightfoot) Lamouroux and *D. herbacea* (Turner) Lamouroux. Details of the morphology of these 4 species clear up some fine points in their development and structure. Not finding reproduction the writer seems to doubt whether Okamura found it in *D. tabacoides*, and states that it may have been reproduction in a species of *Phycocelis* growing upon the *Desmarestia*.—T. C. Frye.

1244. PILGER, R. Algae Mildbraedianaee Annabonenses. Bot. Jahrb. 57: 1-14. Fig. 1-34. 1920.—This is a list of the algae collected by Dr. J. MILDBRAED in 1911 on Annobon, the smallest of the Guinea Islands. Notes are given on distribution and critical features of morphology. Thirty-three species and varieties are included in the list of which the following are described as new: *Bryopsis densa*, *Struvea multipartita*, *Scinaia furcellata* (Turner) Biv. var. *constricta*, *Caulacanthus ustulatus* (Mert.) Kütz. var. *fastigiatus* (Kütz.) Pilger n. comb. (*C. fastigiatus* Kütz.), *Laurencia brachyclados*, *Herposiphonia brachyclados*, *Lophosiphonia adhaerens*, *Callithamnion Mildbraedii*, *Ceramium leptosiphon*.—K. M. Wiegand.

1245. PUYMALY, A. DE. Sur une petite algue verte aerophile (*Prasiola leprosa* Kütz.). [A small aerophilous alga (*Prasiola leprosa* Kütz.).] Compt. Rend. Acad. Sci. Paris 171: 189-192. 1920.—On the basis of the structure of the chromatophore and the normal reproduction by aplanospores it seems desirable to transfer the form referred to by PETERSEN as *Pleurococcus calcarius* to the species named in the title.—C. H. & W. K. Farr.

1246. RAINERI, R. Corallinacee del litorale tripolitano. [Corallinaceae of the Tripolitan littoral.] Atti R. Accad. Lincei Roma Rendiconti Cl. Sci. Fis. Mat. e Nat. V, 29^a: 282-288, 313-318. 1920.—The following algae collected by C. F. PARONA in 1912-13 were studied and described after the methods of Mme. LEMOINE: *Lithothamnium crispatum* Haucki, *L. Haucki* Rothpeltz, *L. Lemormandi* Areschoug, *L. Philippii* Foslie, *L. fruticulosum* (Kütz.) Foslie, *Lithophyllum expansum* Philippi, *L. Byssoides* Lamark, *L. decussatum* Ellis and Solander, and *Melobesia Lejolsii* Rosan.—F. M. Blodgett.

1247. RAINERI, R. Corallinacee del litorale tripolitano. Nota III. [The Corallinaceae of the Tripolitan littoral.] Atti R. Accad. Lincei Roma Rendiconti Cl. Sci. Fis. Mat. e Nat. V, 29^a: 356-358. 1920.—Continuing from previous articles he describes the following species of calcareous algae collected by Prof. PARONA: *Corallina officinalis* Linn., *C. mediterranea* Areschoug, and *Peyssonelia rubra* Grey. The first 2 are new to the Tripolitan littoral.—F. M. Blodgett.

1248. SAUVAGEAU, C. Nouvelles observations sur l'Ectocarpus Padinae Sauv. [New observations on Ectocarpus Padinae Sauv.] Compt. Rend. Acad. Sci. Paris 171: 1040-1044. 1920.—A study of the reproductive structures of this parasite of *Padina Pavonia* reveals three sorts of plurilocular structures, namely, the megasporangia, the meiosporangia, and the antheridia. The meiosporangia and the megasporangia both produce spores which develop into plants directly. The spores of the megasporangia vary from planospores to aplano-spores. These germinate without fecundation and hence the sperms are useless structures with no function in the life-history of the plants so far as is known. There are some indications that *Acinetospora pusilla* and *Ectocarpus Padinae* are different phases of the same life cycle, just as has been found in the Cutleriaceae and other families of the brown algae.—C. H. Farr.

1249. SCHRÖDER, B. Die neun wesentlichen Formentypen von Ceratium hirundinella O. F. Müller. [The nine fundamental form-types of Ceratium hirundinella.] Arch. Naturgesch. Abt. A. 84: 222-230. Fig. 1-9. 1918 [1920].—The author distinguishes, describes, and figures 9 forms falling within the limits of this species and discusses briefly types intermediate between these forms.—C. E. Allen.

1250. SCHRÖDER, BRUNO. Über Seebälle. [Concerning Pondballs.] Naturwissenschaften 8: 799-803. 1920.—The curious spherical growths of the algae *Aegagrophila*, *Spongomorpha*, *Valonia*, *Lithothamnium*, and *Rivularia*, as well as similar balls of animal origin are discussed in the above article.—O. L. Clark.

1251. SETCHELL, WILLIAM ALBERT, AND NATHANIEL LYON GARDNER. The marine algae of the Pacific coast of North America, Part 1, Myxophyceae. Univ. California Publ. Bot. 8: 1-138. Pl. 1-8. 1919.—The first part of the Marine Algae of the Pacific Coast of North America, comprising an account of the Myxophyceae, or blue-green algae, is presented by the authors without introduction or explanation, pending the publication of the other 3 parts. This part, otherwise, is complete in itself except as to an index. It has descriptions of the subclass, orders, families, genera, species, etc., together with citations of the literature, keys, distributional and critical notes. It contains no new species or new names.—W. A. Setchell.

1252. SETCHELL, WILLIAM ALBERT, AND NATHANIEL LYON GARDNER. The marine algae of the Pacific coast of North America, Part II, Chlorophyceae. Univ. California Publ. Bot. 8: 139-374. Pl. 9-33. 1920.—This is the 2nd part of the account of the Marine Algae of the Pacific Coast of North America, issued by the authors under the same conditions and in the same form as the first [see next preceding entry]. It contains no new species or new names.—W. A. Setchell.

1253. SETCHELL, WILLIAM ALBERT, AND NATHANIEL LYON GARDNER. Phycological contributions, I. Univ. California Publ. Bot. 7: 279-324. Pl. 21-31. 1920.—The following new genus, new species, and new combinations are proposed:—*Hormiscia doliifera* sp. nov., *Spongomorpha Mertensii* (Rupr.) comb. nov., *Capsosiphon fulvescens* (Ag.) comb. nov., *Enteromorpha groenlandica* (J. Ag.) comb. nov., *Monostroma areolatum* sp. nov., *Ulva stenophylla* sp. nov., *U. vezata* sp. nov., *U. angusta* sp. nov., *U. lobata* (Kuetz.) comb. nov., *U. expansa* (Setch.) comb. nov., *U. dactylifera* sp. nov., *U. taeniata* (Setch.) comb. nov., *Prasiola nevadensis* sp. nov., *P. meridionalis* sp. nov., *P. delicata* sp. nov., *Entocladia cingens* sp. nov., *E. codicola* sp. nov., *Internoretia* gen. nov., *I. Fryeana* sp. nov., *Pseudubella prostrata* (Gardner) comb. nov., *Ps. applanata* sp. nov., *Ps. consociata* sp. nov., *Pseudopriingsheimia apiculata* sp. nov., *Gomontia Bornetii* nom. nov., *G. habrorhiza* sp. nov., and *G. caudata* sp. nov.—W. A. Setchell.

1254. SMITH, GILBERT MORGAN. Phytoplankton of the inland lakes of Wisconsin. I. Myxophyceae, Phaeophyceae, Heterokontaeae, and Chlorophyceae exclusive of the Desmidiaceae. Bull. Wisconsin Geol. Nat. Hist. Survey 57. 243 p., 51 pl. 1920.—A detailed description of

the phytoplankton of Wisconsin lakes is presented. The species have been critically studied, and many new observations on life histories and variations are discussed. Keys to all the species are included. The following new species and varieties are described: *Crucigenia truncata*, *Selenastrum Westii*, *Echinospaerella limnetica*, *Tetraedron victorieae* var. *major*, *Westella linearis*, *Volvox mononae*, *Chlamydomonas epiphytica*, *C. dinobryoni*, *Rhizochrysis limnetica*, *Gloeothece linearis* var. *composita*, *Aphanocapsa elachista* var. *planctonica*, *Aphanocapsa endophytica*, *Merismopedia elegans* var. *major*, and *Chroococcus dispersus* var. *minor*.—*E. N. Transeau*.

1255. TILDEN, JOSEPHINE E. Bibliography of the literature relating to the Pacific Ocean algae and to the freshwater algae of the countries bordering upon the Pacific Ocean. 58 p. Privately published. 1920.—See Bot. Absts. 7, Entry 1606.

1256. VIIG, OLAF B. Brunalger og rodalger fra omegnen af Aalesund. [Brown and red algae from the vicinity of Aalesund, Norway.] *Nyt Mag. Naturvidenskaberne* 56: 167-176. 1919.—Notes are presented on distribution of algae found during summers of 1907 and 1909, chiefly on coast exposed to open sea.—*A. Gundersen*.

1257. WILLE, N. Algologische Notizen XXV-XXIX. [Algological notes.] *Nyt Mag. Naturvidenskaberne* 56: 1-60. 2 pl. 1919.—This series of notes deals with the following: The variability of *Scenedesmus bijugatus* and *S. obliquus*; the germination of aplanospores in *Coelastrum*; a list of the freshwater algae of Beeren Island; a change of the name *Lyngbya epiphytica* Wille to *L. Willei* Setchell & Gardner; and further study of Agardh's herbarium has led to additional synonyms for *Gloeocapsa sanguinea* Kütz., *Glaucozystis bullosa* (Kütz.) Wille, *Aphanocapsa mucicola* (Menegh.) Wille, *Gloeocapsa magma* Kütz., *Chroococcus aurantius* Wille, and *Tetraspora bullosa* Kütz.—*E. N. Transeau*.

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

ALEXANDER W. EVANS, *Editor*

(See also in this issue Entries 953, 976, 1066, 1211, 1224, 1291)

1258. BRITTON, ELIZABETH G. Bahama mosses. *Bryologist* 24: 17-19. Pl. 1. 1921.—A list of the mosses contributed to the Bahama flora, 33 species in 28 genera, is here printed for convenience of reference. *Hymenostomum flavescens* E. G. Britton is described and figured.—*E. B. Chamberlain*.

1259. BROTHERUS, V. F. Contribution à la flore bryologique de l'Ecuador. [Contribution to the moss flora of Ecuador.] *Rev. Bryologique* 47: 35-46. 1920.—The first part of this paper has already been abstracted (see Bot. Absts. 7, Entry 350). In this second and concluding part 63 species of mosses belonging to 11 families are listed with the usual full data regarding stations. The families most largely represented are the Hookeriaceae with 17 species, the Hypnaceae with 13, and the Sematophyllaceae with 11. The following species, 15 in all, are described as new: *Crossomitrium saprophilum*, *C. splendens*, *Cyclodictyon Allionii*, *Hookeriopsis armata*, *Lepidopilum Allionii*, *L. argutidens*, *L. leucomioides*, *L. phyllophilum*, *L. subgracile*, *Pilotrichum armatum*, *P. longicaule*, *Pterogonium liliputanum*, *Rhynchostegium parvulum*, *Stereohypnum oxyrrhynchioides*, and *S. rivulare*.—*A. W. Evans*.

1260. GARJEANNE, A. J. M. Gemmen bei *Gymnocolea inflata* Dum. [Gemmae of *Gymnocolea inflata*.] *Hedwigia* 61: 300-302. 1 fig. 1919.—The author reports the occurrence of gemmae in *Gymnocolea inflata*, a species which was supposed to lack them. The gemmae are angular, very pale yellowish green bodies, 20-40 μ in diameter, and composed of 2 unequal cells. They germinate readily and grow in the usual way. The gemmae are borne on the margins of rudimentary pale green leaves and appeared in a dried up culture which had been moistened and thus stimulated to renewed growth. It is questioned whether any of the Jungermanniae are really without gemmae.—*D. Reddick*.

1261. HERZOG, TH. Die Laubmoose der II. Freiburger Mulukkenexpedition. [The mosses of the second Freiburg expedition to the Molucca (Spice) Islands.] Hedwigia 61: 286-299. Pl. 3, 7 fig. 1919.—The collections here reported upon were made by K. DENIGER, director of the expedition, and E. STRESEMANN, who accompanied him as zoologist. Most of the specimens came from the islands of Ceram and Buru and from the Malayan peninsula. The total number of species listed is 66, of which the following are described as new: *Dicranoloma braunfelsioides* from Ceram; *Ctenidium moluccense* and *Hypnodendron caducifolium* from Buru; *Ectropothecium serratum*, *Homaliodendron pinnatelloides*, *H. intermedium*, and *Taxithelium Denigeri* from the Malayan peninsula. Fifteen of the other species, which bear Herzog's name as authority, had already been published in a paper dated 1916. In addition several new varieties, forms, and combinations are proposed. The species illustrated are *Hymenodontopsis Stresemanni* Herzog, the 2 new species of *Homaliodendron*, and *H. flabellatum* (Dicks.) Fleischer.—D. Reddick.

1262. HOLZINGER, JOHN M. On our American form of *Timmia megapolitana* Hedw. Bryologist 23: 86-88. Fig. 1-5. 1920.—The American specimens referred to *Timmia megapolitana* are shown to differ from the European in several respects. The leaves, for example, are less papillose and less serrate, the leaf-base is more hyaline, the antheridia are yellow, and the calyptra remains attached. The actual status of the American plant is at present undecided.—E. B. Chamberlain.

1263. HOLZINGER, JOHN M. Dixon and Watts on Antarctic mosses. [Rev. of: DIXON, H. N., AND W. W. WATTS. Mosses. Australasian Antarctic Expedition Sci. Rept. Ser. C. 7: 1-9. 1918 (see Bot. Absts. 7, Entry 1973).] Bryologist 23: 47. 1920.—The reviewer commends the conservative tendency of the authors in their treatment of the genus *Bryum*.—E. B. Chamberlain.

1264. LORCH, WILHELM. Über das Vorkommen von Calciumoxalatkrystallen in den Sporogonien von *Polytrichum commune* L. [On the occurrence of crystals of calcium oxalate in the sporogonia of *Polytrichum commune*.] Hedwigia 60: 342-349. 1919.—The presence of crystals of calcium oxalate in the capsules of *Polytrichum commune* is reported. Other species of *Polytrichum* examined failed to show them, and they have not been demonstrated in any other bryophytes. The crystals are most abundant in the epidermal cells of the spore-case but occur also in the columella, the walls of the spore-sac and the operculum. In discussing the structure of the capsule certain dorsiventral peculiarities are emphasized.—A. W. Evans.

1265. LUISIER, A. Les mousses de Madère. [Mosses of Madeira.] Broteria Ser. Bot. 18: 99-120. 1920.—The present article (the ninth of the series) contains analytic keys to all the families, genera, and species of mosses (through *Fissidens*), which occur in Madeira and the adjoining islands. The keys incorporate brief descriptions and have references to the author's previously published articles. [See Bot. Absts. 1, Entry 757; 3, Entries 2447, 2448; 6, Entry 156; 7, Entry 351].—E. B. Chamberlain.

1266. MACHADO, ANTÓNIO. Catálogo descritivo de Briologia Portuguesa. [Descriptive catalogue of Portuguese mosses.] 143 p. Lisbon, 1919.—This catalogue lists all the species and varieties of mosses occurring in Portugal. Of most species the author has seen authentic material; in the remaining cases he cites authoritative records. To facilitate determinations analytic keys based upon easily determined vegetative characters are included, and each species or variety is characterized in 4 or 5 lines of description in the body of the work. In all cases where fuller descriptions are not accessible in standard works, a foot-note gives the original description in full. The total census, omitting varieties, shows 7 species of Sphagnales, 4 of Andreaeales, and 313 of Bryales. The classification follows that of DIXON & JAMESON'S Handbook. For each form there is a detailed statement of distribution for Portugal, definite localities and collectors being cited without generalized statements. Following the catalogue there is a glossary, a page of errata, a page of addenda, and a complete

index. The author has not hesitated to revive old names or to reduce species to varieties. There are in consequence over 20 new combinations, although no forms whatsoever are proposed as new. The new specific combinations proposed are the following, Machado being the authority in each case: *Camptothecium philippeanum* (Spruce), *Cinclidotus mucronatus* (Brid.), *Plagiopus ithyphyllus* (Brid.), *P. pomiformis* (Hedw.), *P. strictus* (Brid.), *Tortula meridionalis* (Luisier), and *Trichostomum humile* (Hedw.).—*E. B. Chamberlain.*

1267. MÖLLER, H. Beiträge zur Moosflora Javas, Straits Settlements und Birmas. [Contributions to the moss flora of Java, the Straits Settlements and Burma.] Hedwigia 60: 313–330. 5 fig. 1919.—The author enumerates 206 species of mosses which he collected in 1897, giving definite localities in each case. Of the species listed 194 came from Java, 28 from the Straits Settlements, and 14 from Burma, most of the species from the last 2 regions being recorded also from Java. Three of the Javan species are likewise listed from Sumatra. The specimens were all determined by V. F. BROTHERUS and the following 3 species, all from Java, are proposed as new on his authority and figured: *Acanthocladium scabrifolium*, *Rhizogonium salakanum*, and *Stereophyllum Mölleri*.—*A. W. Evans.*

1268. PEARSON, WM. HY. Aplozia Pendletonii Pearson. Bryologist 23: 84–85. Fig. 1–3. 1920.—This note completes the description of a species of hepatic recently proposed as new [see Bot. Absts. 7, Entry 352].—*E. B. Chamberlain.*

1269. PEARSON, WM. HY. Porella rivularis (Nees) Lindb. Bryologist 23: 85–86. 1920.—This note, which is based on material from Oregon collected by C. PORTER, deals with the synonymy and distinctive characters of the hepatic, *Porella rivularis*.—*E. B. Chamberlain.*

1270. POTIER DE LA VARDE, R. Observations sur quelques espèces du genre Fissidens. [Observations on certain species of the genus Fissidens.] Rev. Bryologique 47: 33–35. 1920.—The earlier parts of the series to which the present paper belongs have already been abstracted (see Bot. Absts. 5, Entry 627; 6, Entry 158; 7, Entry 1975). In this part *Fissidens Monguilloni* Thériot and its occurrence in the French departments of la Mayenne and la Manche are discussed. The distinctive features of the species are described, several specimens from the departments in question are referred to it, and the opinion is advanced that it has a wider distribution than had been supposed.—*A. W. Evans.*

1271. POTIER DE LA VARDE, R. Sur le pédicelle du *Stereophyllum Bremondii* Th. et P. de la V. [On the seta of *Stereophyllum Bremondii*.] Rev. Bryologique 47: 35. 1920.—The seta of *Stereophyllum Bremondii* is smooth, while that of the closely related *S. Blatterii* is papillose. Through an oversight this distinction was not brought out in the original description of *S. Bremondii*. (See Bot. Absts. 7, Entry 1976).—*A. W. Evans.*

MORPHOLOGY AND TAXONOMY OF FUNGI, LICHENS, BACTERIA, AND MYXOMYCETES

H. M. FITZPATRICK, *Editor*

(See also in this issue Entries 953, 1074, 1111, 1211, 1344, 1347, 1348, 1349, 1350, 1352, 1353, 1354, 1355, 1356, 1382, 1386, 1390, 1392, 1395, 1398, 1402, 1405, 1409, 1410, 1541)

FUNGI

1272. ADAMS, J. F. Observations on the infection of *Crataegus* by *Gymnosporangium*. Mycologia 13: 45–49. Fig. 1–4. 1921.—Ten species of *Crataegus* not previously reported as hosts for *Gymnosporangium germinale* and 6 not previously reported for *G. globosum* are included.—*H. R. Rosen.*

1273. ARTHUR, J. C. Nineteen years of culture work. *Mycologia* 13: 12-23. 1921.—A discussion of the writer's conception as to what criteria must be used in delimiting rust species, and an exposition of various changes in this conception as brought about by the gradually increasing knowledge of the rusts. Cultural work (infection experiments) was primarily undertaken to aid in a proper taxonomic treatment of species and the results of 19 years of such effort are shown to have aided (1) in completing the life cycles for many species, (2) in recognizing races within a species, and (3) in assuring a liberal point of view concerning the fixity of such features as open or covered telia, 1- or 2-celled teliospores (*Uromyces* and *Puccinia*), variation in number of the pores of the urediniospore, and in the position of these pores. By means of cultural work much progress was made in delimiting a number of distinct species among the grass rusts possessing sub-epidermal telia and in reducing to synonymy a large number of names. American *Carex* rusts, all of which had borne the names *Puccinia caricis* or *P. caricina*, were separated into a number of distinct species. The idea, held when the cultural work began, that hosts of any one species of rust would be found to be closely related was upset when it was shown that the aecial hosts of *Puccinia subnitens* belonged to a number of different families. The conception of species was further modified when it was found that collections of a single rust on different hosts show marked morphological differences. Cultures also showed that teliospores among the grass rusts are not necessarily resting spores. "The culture work began with the too prevalent idea that all rusts could be expected to conform in general to the well known *Puccinia graminis*. It closed with the conviction that the rusts are far too diversified in their morphology, their numerous characters, their physiological adaptations, and their range of hosts, to be represented by *Puccinia graminis* in more than one out of numerous aspects."—H. R. Rosen.

1274. ARTHUR, J. C. New species of Uredineae XII. *Bull. Torrey Bot. Club* 47: 465-480. 1920.—*Melampsora americana*, *Puccinia offuscata*, *P. senilis*, *P. gulosa* H. S. Jackson, *Uredo contraria*, *U. nitidula*, *Aecidium Izorae*, *Ae. indecisum*, *Ae. Mitellae* Ellis & Ev., *Ae. sub-simulans* Arthur & Mains, *Ae. Betheli*, *Ae. arctoum*, *Ae. renatum*, *Ae. arcularium*, *Ae. Liabi*, *Ae. Batesii*, *Ae. Mesadeniae*, and *Ae. praecipuum* are described as new species. The following new names and new combinations are also given: *Pucciniastrum americanum* (Farl.) comb. nov., *Puccinia proximella* (Arth.) comb. nov., *P. hiascens* nom. nov., *P. Heterisiae* H. S. Jackson nom. nov., *Uromyces imperfectus* nom. nov., and *Uredo laeticolor* nom. nov.—P. A. Munz.

1275. BAL, S. N. Commentationes Mycologicae. 8. *Pseudoperonospora cubensis* (B. & C.) Roxten, on *Trichosanthes dioica* Roxb. *Jour. Dept. Sci. Calcutta Univ.* 3: 1-3. 4 fig. 1920.—The first record of the fungus from Bengal. A short description is given.—Winfield Dudgeon.

1276. BAL, S. N. Commentationes Mycologicae. 9. *Cercospora personata* (B. & C.) Ellis, on *Arachis hypogaea* Linn. *Jour. Dept. Sci. Calcutta Univ.* 3: 4-6. 4 fig. 1920.—A record of the occurrence of the fungus in Bengal.—Winfield Dudgeon.

1277. BAL, S. N., AND K. G. BANERJEE. Commentationes Mycologicae. 10. *Rhinocladium corticolum* Mass., on the bark of *Mangifera indica* Linn. *Jour. Dept. Sci. Calcutta Univ.* 3: 7-8. 5 fig. 1920.—A record of the occurrence of the fungus in Bengal.—Winfield Dudgeon.

1278. BARLOT, J. Sur de nouvelles réactions colorées utilisables pour la diagnose d'especes mycologiques. [On new color reactions useful in distinguishing species of fungi.] *Compt. Rend. Acad. Sci. Paris* 171: 1014-1016. 1920.—An aqueous solution of potash in 20-40 per cent concentration is recommended. It can be used to distinguish the poisonous *Mycena pura* from the edible *Laccaria laccata*, the former giving a yellow and the latter a dark brown color. *Gomphidius viscidus* gives a violet brown, *G. glutinosus* a feeble yellowish brown, and *Amanita junquilla* an orange yellow color; and *Lactarius turpis* yields a variety of color reactions with various acids and alkalies.—C. H. Farr.

1279. BLASDALE, WALTER C. A preliminary list of the Uredinales of California. Univ. California Publ. Bot. 7: 101-157. 1919.—A list of the rusts of California intended to assist collectors in naming new collections and to tabulate all the known forms and their host plants. Some 236 species or forms are enumerated, arranged under the genera according to the families of the host-plants they inhabit.—W. A. Setchell.

1280. BONAR, LEE. Wilt of white clover, due to *Brachyспорium trifolii*. Phytopath. 10: 435-441. 3 fig. 1920.—A disease of the foliage of white clover, *Trifolium repens*, found on a lawn near Washington, D. C., is described. Some cultural characters and a technical description of *Brachyспорium trifolii* Kauffman are given.—F. R. Jones.

1281. BRITTON, NATHANIEL LORD, AND CHARLES FREDERICK MILLSPAUGH. The Bahama Flora. Roy. 8vo., viii + 695 p. Published by the authors: New York, June 26, 1920.—See Bot. Absts. 7, Entry 1429.

1282. BROWN, NELLIE A. A *Pestalozzia* producing a tumor on the sapodilla tree. Phytopath. 10: 383-394. 5 fig. 1920.—This disease occurred in Buena Vista, Florida. The results of inoculation both upon sapodilla and upon other hosts are reported. The spores are described. Favorable media are mentioned. Comparison with other tumor-forming species of *Pestalozzia* indicates that this is a separate species. The name *Pestalozzia scirrofaciens* n. sp. is suggested. Control consists of destruction of infected trees.—Ruth G. Bitterman.

1283. CHURCH, MARGARET B. Laboratory experiments on the manufacture of Chinese Ang Khak in the United States. Jour. Indust. Eng. Chem. 12: 45-46. 1920.—The characteristics of red rice are due to a mold, *Monascus purpureus*.—Henry Schmitz.

1284. CLELAND, J. BURTON, AND EDWIN CHEEL. Australian Fungi: Notes and descriptions. No. 2.—The Sclerotia-forming polypores of Australia. Trans. and Proc. Roy. Soc. South Australia 43: 11-22. Pl. 1-5. 1919.—There is brought together within the limits of the article all that is known of the sclerotial forms of polypores of Australia. Two are described as possessing true sclerotia: *Polyporus mylittae* Cooke and Massee and *Polyporus minor-mylittae*. Two are described as possessing false sclerotia: *Polyporus tumulosus* Cooke and *Polyporus basilapiloides* (McAlp. and Tepper). The article is accompanied by photographs of sclerotia and of sclerotia to which fruiting bodies are attached. [See also Bot. Absts. 4, Entry 1070; 8, Entry 1285.]-J. H. Faull.

1285. CLELAND, J. BURTON, AND EDWIN CHEEL. Australian fungi: Notes and descriptions. No. 3. Trans. and Proc. Roy. Soc. South Australia 43: 262-315. Pl. 28-29. 1919.—This paper is a continuation of two previous ones on Australian fungi. The following species are described as new: *Amanitopsis punctata*, *Clitocybe paradiptera*, *Cantharellus lilacinus*, *C. imperatae*, *C. nigripedes*, *C. corrugatus*, *Russula flocktonae*, *R. erumpens*, *Mycena banksiae*, *M. coccineus*, *Pleurotus subostreatus*, and *Boletus scarlatinus*. [See also Bot. Absts. 4, Entry 1070; 8, Entry 1284.]-J. H. Faull.

1286. COUTINHO, ANTONIO XAVIER PEREIRA. Eubasidiomycetes Lusitanici Herbarii Universitatis Olisiponensis. [Eubasidiomycetes of Portugal represented in the herbarium of the University of Lisbon.] 195 p. Manuel Lucas Torres: Lisbon, 1919.—A taxonomic paper giving descriptions of all the Eubasidiomycetes of Portugal as represented in the herbarium of the University of Lisbon. The paper is not illustrated. It is provided with keys to the genera. A total of 511 species is included.—H. M. Fitzpatrick.

1287. DAVIS, J. J. [Note under "Notes and Brief Articles."] Mycologia 13: 58. 1921.—Records 30 collections of *Pucciniastrum arcticum* from Wisconsin, all on *Rubus triflorus*.—H. R. Rosen.

1288. DIEHL, WILLIAM W. The fungi of the Wilkes Expedition. Mycologia 13: 38-41. 1921.—Attention is called to 8 species of fungi described as new by Berkeley and Curtis, most of which heretofore have been overlooked. H. R. Rosen.

1289. DUFRENOY, JEAN. The occurrence of *Actinomyces*-like endotrophic mycorrhiza. *New Phytol.* 19: 40-43. *Fig. 1-5.* 1920.—*Actinomyces* is held responsible for 2 cases of endotrophic mycorrhiza. This conclusion demands for proof further investigation of the cases and also a precise definition of the genus *Actinomyces*. Descriptions are given of the morphology and staining reactions of the mycorrhiza.—I. F. Lewis.

1290. FINK, BRUCE, AND SYLVIA C. FUSON. Ascomycetes new to the flora of Indiana. *Proc. Indiana Acad. Sci.* 1918: 264-275. 1920.—The authors list 135 species distributed among 43 families, with host or substratum and county. Many of these Ascomycetes are associated with algae in lichens. Two species, *Pyrenopsis fuscoatra* Fink sp. nov. and *Verucaria sordida* Fink sp. nov., are new.—F. C. Anderson.

1291. FISCHER, L. Tabellen zur Bestimmung einer Auswahl von Thallophyten und Bryophyten. [Keys for the determination of a selected group of thallophytes and bryophytes.] 60 p. Bern, 1918.—This series of keys was prepared for the use of students in the University of Bern. The first edition appeared in 1898 and the second in 1903. After the death of the author, a revised edition was published by his son, E. FISCHER, in 1910, and the present publication is the second edition of the revision. Representatives of the myxomycetes, bacteria, algae, fungi, liverworts, and mosses are included, more attention being given to the fungi than to any other group.—A. W. Evans.

1292. FRIES, THORE C. E. Bidrag til Tromsø Amts gasteromycetflora. [Contribution to the flora of gasteromycetes of Tromsø Amt, Norway.] *Bergens Mus. Aarbok Naturv.* Raekke 1917-18: 10 p. 1920.—Notes on species of Lycoperdaceae and Nidulariaceae. *Calvatia saccata* (Vahl) Morg. var. *alpina* n. var. is given.—A. Gundersen.

1293. GODFREY, G. H. *Sclerotinia Ricini* n. sp. on the castor bean (*Ricinus communis*). *Phytopath.* 9: 565-567. *Pl.* 40-41. 1919.—A hitherto undescribed species of *Botrytis*, causing a serious disease of the castor bean, is shown to be the conidial condition of a species of *Sclerotinia* which is here described as *S. Ricini* n. sp. The *Botrytis* was repeatedly obtained from single ascospore isolations.—H. M. Fitzpatrick.

1294. GROVE, W. B. Mycological notes, V. *Jour. Botany* 58: 249-251. 1920 (continued from *Jour. Botany* 57: 210. 1919, and to be continued).—The writer presents additional notes on *Russula claroflava* Grove, and a revised description of that species. It was found to grow always on grassy ground among trees on the borders of a sphagnum bog. *Boletus sanguineus* Withering was rediscovered by the writer, and a description is given. It is noted that a certain number of closely related species would be better treated as subdivisions of a comprehensive species, e.g., *B. chrysenteron*. *Monilia candicans* Sacc. is redescribed from a specimen obtained in Cofton Park. It is probably the same as *Monilia caespitosa* Relh. about which there has been much doubt. The statement of authors that the spores are in ternate spikes is misleading, as ternate spikes are only occasional. A brief note in correction of "Mycological notes IV" is appended. The corrections concern an unnamed species of *Phyllosticta*, and *Sphaerulina intermixta* f. *valde-evoluta*.—K. M. Wiegand.

1295. HERRMANN, EMIL. Pilzschadlinge an Drogen. [Fungi detrimental to drugs.] *Pharm. Zentralhalle* 61: 95-100. 1920.—A detailed study of the action of various kinds of fungi on drugs. The forms enumerated include Myxomycetes, Peronosporaceae, Perisporiaceae, Ustilaginales, Uredinales, Exobasidiales, and Exoascaceae.—H. Engelhardt.

1296. JONES, FRED RUEL, AND CHARLES DRECHSLER. Crownwart of alfalfa caused by *Urophlyctis alfalfae*. *Jour. Agric. Res.* 20: 295-323. *Pl.* 47-56. 1920 [1921].—Crownwart has been known in the United States for about 10 years. It is still confined to Pacific slope sections and is not a serious disease. *Urophlyctis alfalfae* seems to be limited to *Medicago sativa* and *M. falcata*. The disease originates in infection of very young buds in early spring; the foliar elements of these develop into abnormalities not involving the mature structures of

root or stem. In the presence of abundant moisture, the galls complete development in early summer; most of them decay rapidly but some live over winter. The fungous body consists of turbinate cells and resting spores. At all stages of development of the gall characteristic masses of brown resting spores are present. The first turbinate cell is the immediate development of the infecting body and becomes polynucleate; from this uninucleate peripheral segments are cut off at the apex. A hyphal structure of limited growth develops from each of these; its expanded nucleate termination constitutes the turbinate cell of the next succession. At its mature stage the turbinate cell bears a branched apical haustorium, the axis of which proliferates at its tip a globose expansion into which the polynucleate protoplasm passes to produce the resting spore; the latter is characterized by 9 to 15 branched haustoria zonately arranged, or only by scars of these when ripe. No evidence of any sexual process in the production of these spores was found.—The abundant development of the disease is associated with excessive soil moisture during the infection period and control measures leading to reduction of soil moisture at this time are indicated.—*F. Weiss.*

1297. KEISSLER, KARL VON Revision des Sauterschen Pilzherbars. [Revision of Sauter's fungus herbarium.] Ann. Naturhist. Hofmus. Wien 31: 77-138. 1917.—There is a list of Sauter's mycological publications and an introduction. The special part consists of 3 subdivisions: (1) A list of Sauter's species based upon types in his herbarium, (2) a list of Sauter's species of which there are no specimens in the herbarium, and (3) a list of species other than Sauter's of which there are specimens in the herbarium. Several herbarium names credited to Sauter are given but are not accompanied by formal descriptions. *Peziza alboflava* Saut. (*Lachnea alboflava* Sacc.) is technically a new combination concerning which there is a note. The list is amply annotated.—*A. S. Hitchcock.*

1298. KOPS, JAN, F. W. VAN EEDEN, EN L. VUYCK. Flora Batava. Afbeelding en beschrijving der Nederlandsche gewassen. [Flora Batavia. Illustrations and descriptions of plants of Holland.] Parts 400-401. Folio, pl. 1993-2000 [colored]. Martinus Nijhoff: 's-Gravenhage, 1920.—The present parts contain illustrations and descriptions of several vascular and non-vascular plants. The non-vascular plants are: *Inocybe fastigiata* Schaef., *Tricholoma cerinum* P., *Lepiota cinnabarina* Schwein., *Peniophora quercina* Cooke, *Cortinarius (Myzaceum) vibratilis* Fr., *Marasmius prasiomus* Fr., and *Clitocybe claviceps* P. [See also Bot. Absts. 1, Entry 635; 5, Entry 2347; 7 Entry 1457; 8, Entry 1541].—*J. M. Greenman.*

1299. LEIBY, R. W. The larger corn stalk borer. Bull. North Carolina Dept. Agric. 41¹³: 5-85. 27 fig. 1920.—Several fungus parasites are mentioned in the discussion of the biology of this insect. These include *Isaria barberi* Gd., *Hirsutella* sp., and *Metarrhizium anisopliae* (Metsch.) Sor.—*F. A. Wolf.*

1300. MAYOR, EUGEN. Notes mycologiques. [Mycological notes.] Bull. Soc. Neuchâtoise Sci. Nat. 42: 62-113. 1916/17 [1918].—Parasitic fungi of Neuchâtel. *Puccinia centaureae-rhapontici* on *Centaurea rhaponticum* is new. *Aecidium* on *Crepis biennis* is connected with *Puccinia pentasiti-pulchellae* Lüdi, and that on *Helleborus foetidus* with *Melampsora abieticaprearum* Tub. [Through Abst. by MATROUSCHEK in Zeitschr. Pflanzenkrankh. 30: 147. 1920].—*D. Reddick.*

1301. MEINECKE, E. P. Facultative heteroecism in *Peridermium cerebrum* and *Peridermium harknessii*. Phytopath. 10: 270-297. 2 fig. 1920.—Additions to the California host lists of *Peridermium cerebrum* and *Cronartium cerebrum* are reported. Direct infections have resulted from inoculations of several species of pine with aeciospores of *Peridermium cerebrum*. *P. harknessii* Moore retains its ability to produce uredinia and telia on scrophulariaceous hosts, but, in addition, the aeciospores produce galls and aeciospores on the several species of pine tried. The resulting aeciospores germinate like true aeciospores. The heteroecism of *P. cerebrum* and *P. harknessii* is facultative.—*G. Wineland.*

1302. OVERHOLTS, L. O. Some New Hampshire fungi. *Mycologia* 13: 24-37. 1921.—A list of 195 species of fungi under 77 different genera collected mainly by the writer, the Eu-Basidiomycetes being best represented. Hosts or substrata, and locality are given under each species.—H. R. Rosen.

1303. [PENNELL, FRANCIS W.] Index to American mycological literature. *Mycologia* 13: 62-65. 1921.

1304. PUTTEMANS, ARSENE. *Gloeosporium Bombacis*, n. sp. *Bull. Soc. Path. Veg. France* 7: 74-75. 1920.—This fungus was found in the vicinity of Sao Paulo, Brazil, on the bark of young shoots of *Bombax* (*Pachyra*) *insignis*, forming irregular, clear, brown spots later becoming darker. On these spots were found acervuli of what appears to be an undescribed *Gloeosporium*. The bark on the affected shoots becomes light colored and hard. New shoots arise below the diseased ones and these soon become affected with disease. A technical diagnosis of the fungus is given.—C. L. Shear.

1305. RABAK, F. The effect of mold upon the oil of corn. *Jour. Indust. Eng. Chem.* 12: 46-48. 1920.—The spoilage of corn from the growth of mold is noticeably manifested in connection with the fatty oil.—Henry Schmitz.

1306. RAMSBOTTOM, J. Canvas-destroying fungi. *Nature* 105: 563-564. 1920.—War experiences have shown this to be an important question, especially on "flax made" canvas. Short account of investigations by W. BROUGHTON-ALCOCK in Malta, Italy (*Journal of Royal Army Medical Corps*, Dec., 1919), shows species of *Macrosporium* and *Stemphylium* to be principal agents. Variation in color of spots due to representatives of several other genera. Mycelium was found in canvas ready for making into tents, and it is suggested that its development began during the retting process (not found on new cotton canvas). Willesden method (cuprammonium) and "cutch" treatment prevented growth of fungi. Soft soap, 1 to 5000 solution, followed by a mixture of 1 per cent alum and CuSO_4 greatly inhibited growth and gave good results at Malta. Author states that in Saloniki sodium chromate proved superior to these.—O. A. Stevens.

1307. RAMSBOTTOM, J. [Rev. of: CHURCH, A. H. Elementary notes on the morphology of fungi. *Bot. Mem.* [Oxford] 7. 29 p. 1920.] *Jour. Botany* 58: 181. 1920.

1308. ROBERTS, J. W. *Clitocybe sudorifica* as a poisonous mushroom. *Mycologia* 13: 42-44. 1921.—Detailed symptoms of poisoning due to *Clitocybe sudorifica*, which thus far has been distinguished from *C. dealbata* only by its effects on the mycophagist.—H. R. Rosen.

1309. SALISBURY, E. J. Botany. *Sci. Prog.* [London] 15: 31-34. 1920.—A review of work done on *Actinomyces*.—J. L. Weimer.

1310. SEAVER, FRED J. Fungi [Moulds, blights, and mushrooms], in Britton's "Flora of Bermuda," p. 479-489. 1918.—The author of this chapter presents a general account of the fungi of Bermuda with notes on the various groups and species included. Reference is made to the "Memoirs of the New York Botanical Garden" for August, 1916, where a complete list of the fungi of Bermuda is recorded. No new species of fungi are described in the present volume. [See Bot. Absts. 8, Entries 687, 1320.]—J. M. Greenman.

1311. STAKMAN, E. C., AND L. J. KRAKOVER. *Puccinia graminis* on native *Berberis canadensis*. *Phytopath.* 10: 305-306. 1920.—*Puccinia graminis* was observed for the first time naturally infecting *Berberis canadensis*, the infection being distributed over 8 counties and found spreading to alternate hosts.—E. K. Seymour.

1312. STEVENS, F. L. *Perithecia* with an interfascicular pseudoparenchyma. *Bot. Gaz.* 68: 474-476. *Pl.* Dec., 1919.—A Porto Rican fungus, collected on *Bromelia pinguin*, shows upon examination a pseudoparenchyma occupying the center of the perithecium, instead

of the usual cavity partially filled by asci and paraphyses. This condition suggests the situation in *Penicillium* or in the Plectascineae, except that here the asci arise at the base of the ascocarp. The fungus therefore is placed in a new genus, *Desmotascus*, and the species is named *D. portoricensis*.—H. C. Cowles.

1313. TISDALE, W. B. Iris leaf spot caused by *Didymellina iridis*. *Phytopath.* 10: 148-163. 6 fig. 1920.—The causal fungus, usually known in its conidial state as *Heterosporium gracile*, is traced through its life cycle, and its taxonomy, morphology, and host relationships are considered in detail. The removal of dead infected leaves in spring before new foliage appeared controlled the disease.—F. R. Jones.

1314. TORREND, C. Les Polyporacées du Brésil: Polypéracées stipitées. [Stipitate Brazilian polypores.] *Broteria: Ser. Bot.* 18: 121-143. *Pl.* 5-8. 1920.—The article contains a key to the Brazilian genera of stipitate polypores, a discussion of 34 species of the genus *Amauroderma*, and a key for separation of the species. Each species is given a brief technical description in addition to less formal observations. *A. Gusmanianum*, *A. picipes*, and *A. Mosselmanii* are proposed as new. Photogravure plates illustrate the gross characters of 11 species, or varieties.—E. B. Chamberlain.

1315. WEIDMAN, FRED D. *Penicillium brevicaula* var. *hominis* Saccardo 1877, Brumpt and Langeron, 1910, in an American case of ringworm of the toes. *Arch. Dermatol. and Syphilol.* 2: 703-715. *Fig.* 1-14. 1920.

LICHENS

1316. BACHMANN, E., AND FR. BACHMANN. Litauische Flechten. [Lithuanian lichens.] *Hedwigia* 61: 308-342. 1919.—Collections made in vicinity of Lake Narotsch, 55°N., 27°E. First 12 pages devoted to physiographic, climatological, and plant geographic features of the region with observations on the lichen vegetations of different substrata—soils, stones, trees, etc.—The 204 species found are arranged in systematic order and aside from localities there are brief notes on many species. *Acarospora globosa* (Koerb.) is described fully.—Many species which usually are sterile were found fruiting abundantly. Six lichen parasites are mentioned. A comparison with other lichen floras is included.—D. Reddick.

1317. DURIETZ, G. EINAR. Några lavar från det 16:e skandinaviska naturforskarstmötets excursion i Bergens skärgård. [Some lichens from the excursion of the 16th meeting of the Scandinavian naturalists among islands near Bergen.] *Bergens Mus. Aarbok Nat.* Raekke 1917-1918: 26-29. 1920.—An annotated list of species.—A. Gundersen.

1318. FINK, BRUCE, AND SYLVIA C. FUSON. Ascomycetes new to the flora of Indiana. *Proc. Indiana Acad. Sci.* 1918: 264-275. 1920.—See *Bot. Absts.* 8, Entry 1290.

1319. MERESCHKOVSKY, CONST. Le *Parmelia camtschadalis* existe-t-elle? [Does *P. camtschadalis* exist?] *Hedwigia* 61: 303-307. 1919.—A polemic dedicated to V. P. Savicz. The type is in the herbarium of the Conservatoire Botanique at Geneva.—D. Reddick.

1320. RIDDLE, LINCOLN W. Lichenes, in Britton's "Flora of Bermuda," p. 470-479. 1918.—The author of this chapter presents in systematic order a general account of the lichens, with brief notes on salient characters of the families and species represented. Reference is made to a previous article on the Bermuda lichen flora in the "Bulletin of the Torrey Botanical Club" for April, 1916, where an enumeration of these lichens is given with descriptions of new species and varieties. [See *Bot. Absts.* 1, Entry 1062; 8, Entries 687, 1310.]—J. M. Greenman.

1321. SHIRLEY, JOHN. The thallus of the genus *Parmelia*. *Papers and Proc. Roy. Soc. Tasmania* 1918: 53-68. 1919.

BACTERIA

1322. ANONYMOUS. [Rev. of: GUERNEY-DIXON, S. *The transmutation of bacteria.* xviii + 179 p. University Press: London, 1919.] *Nature* 105: 131-132. 1920.—“Deals with certain variations, morphological and physiological, which are encountered amongst pathogenic bacteria. *** mainly a study of bacteriological literature in the English language.”—O. A. Stevens.

1323. ANONYMOUS. [Rev. of: TANNER, F. W. *Bacteriology and mycology of foods.* vi + 592 p. John Wiley & Sons, New York, Chapman & Hall, London: 1919.] *Sci. Prog.* [London] 15: 160. 1920.

1324. B[ERGET], D. H. [Rev. of: HORT, EDWARD C. *The reproduction of aerobic bacteria.* Jour. Hygiene 18: 369-408. Pl. 4-7. 1920.] *Absts. Bact.* 4: Entry 893. 1920.—Hort's definition of involution forms of bacteria (“An involution form of bacterium can only mean a bacterium which is undergoing retrogressive, or perhaps, degenerative changes. It is strictly speaking, a sterile organism which is not only incapable of maintaining its reproductive activity, but is also incapable of maintaining its integrity of form.”) is at variance with the usual conception of what is meant by the term involution form as it includes also what is commonly meant by the term degeneration form. Hort studied *Bacillus typhosus* in 4 per cent glucose broth and 4 per cent glucose agar. These media are too high in sugar and become too acid for normal nutrition. “Any opinion formed on the modes of reproduction of bacteria when placed under such abnormal conditions must be accepted with great caution.” Hort's conclusion that bacteria multiply not only “by the simple process of transverse binary fission into two equal parts,” but that “under certain circumstances the lower bacteria are able to reproduce themselves by the production of fertile branches and buds, and by endogenous production of gonidial bodies, in addition to the more familiar method of equal binary fission,” is questioned because “it is evident that any alteration of the osmotic tension of culture media will affect the normal process of fission, but these abnormal figures, which everyone has seen, should not be regarded as being modes of reproduction as Hort believes, but rather, abortive attempts of fission.” [See also Bot. Absts. 8, Entry 1328.]—D. Reddick.

1325. CONN, H. J., AND R. S. BREED. A suggestion as to the flagellation of the organisms causing legume nodules. *Science* 51: 391. 1920.—For some time there has been dispute as to whether legume nodule organisms have 1 or several flagella. BURRELL and HANSEN claimed that they were monotrichic, whereas various others have observed peritrichic flagella. HANSEN now says that he, too, has found peritrichic flagella in cultures from clover, vetch, and alfalfa. Hence he suggests that there may be 2 different groups. The question is raised by the authors whether the cowpea and soy bean organisms may not be monotrichic in young cultures and peritrichic when they are older.—A. H. Chivers.

1326. ELLIS, DAVID. Iron-depositing bacteria. [Rev. of HARDER, EDMUND CECIL. *Iron depositing bacteria and their geologic relations.* U. S. Geol. Surv. Professional Paper 113. 89 p., pl. 1-12, fig. 1-14. 1919.] *Nature* 105: 727. 1920.

1327. H., R. T. [Rev. of: ELLIS, D. *Iron bacteria.* xix + 179 p., 5 pl. Methuen and Co.: London, 1919.] *Nature* 105: 323. 1920.

1328. HORT, EDWARD C. The cultivation of aerobic bacteria from single cells. *Jour. Hygiene* 18: 361-368. 1 fig. 1920.—Each of the present methods of isolating single cells (Indian ink, squared coverslip, capillary tube, droplet, and Barber methods) is unsatisfactory. Objections to each method are stated.—For immersion lens examination the following method is found effective: Etch small rings on coverslips; sterilize slips and slides; spread a thin layer of agar on the slides; prepare a dilute culture and place the smallest possible droplet of it in the center of a ring; invert slips on the slide and examine to see whether a single cell is present or not; slides bearing a single organism are incubated and examined at fre-

quent intervals until a colony has developed from which tube cultures may be secured.—When the object is simply to secure a pure culture from a single cell the following method is used: Spread hot nutrient agar over sterilized glass slides; when cool, inoculate from a dilute culture by means of a glass rod; cover the agar with a thin sheet of perforated celluloid; place sterilized coverslips over the perforations and incubate; examine the circlets of medium in the minute moist chambers until one is found which contains a single cell; center the colony in the field, replace the lens with an accurately centered needle (method described), touch the colony, and transfer in the usual way; examine to see that the colony has been touched. [See also Bot. Absts. 8, Entry 1324.]—*D. Reddick.*

1329. HORT, EDWARD C. The reproduction of aerobic bacteria. Jour. Hygiene 18: 369-408. Pl. 4-7. 1920.—A culture of *Bacillus typhosus* was secured from a single cell and studied in 4 per cent glucose broth or 4 per cent glucose agar. Numerous types of organisms, which are illustrated, developed in the cultures. This supports conclusions previously published that the lower bacteria are able to reproduce themselves "by the production of fertile branches and buds, and by the endogenous production of gonidial bodies, in addition to the more familiar method by equal binary fission." These are not regarded as involution forms. The latter are defined as "strictly speaking, a sterile organism which is not only incapable of maintaining its reproduction activity, but is also incapable of maintaining its integrity of form."—Part 2 (p. 382 to 407) is entitled "the effect of the reproductive life of bacteria on the agglutinability of bacterial emulsions." [See Bot. Absts. 8, Entry 1324.]—*D. Reddick.*

1330. KAWAKAMA, KOICHIRO, AND SUEHIRO YOSHIDA. Bacterial disease on *Milletia* plant. (*Bacillus milletiae* n. sp.) Bot. Mag. Tôkyô 34: 110-115. Pl. 2. 1920.—See Bot. Absts. 7, Entry 1190.

1331. KOSER, STEWART A. A bacteriological study of canned ripe olives. Jour. Agric. Res. 20: 375-379. 1921.—In a bacteriological examination of 480 commercial containers of ripe olives, living microorganisms were found in practically every sample which showed either a "swelled" condition or had a bad odor. Sixteen different kinds of organisms were found. Bacteria were commonest, members of the colon group predominating.—Viable organisms were found in a small percentage of containers which were "normal." "These were either aerobic, spore-forming bacilli, cocci or apparently dormant members of the colon group."—*D. Reddick.*

1332. LÖHNIS, F., AND ROY HANSEN. Nodule bacteria of leguminous plants. Jour. Agric. Res. 20: 543-555. Pl. 68-69. 1921.—The nodule bacteria of leguminous plants can be divided into 2 groups. Each group is distinct, morphologically as well as physiologically. The bacteria of the 1st group, which the authors consider to be *Bacillus radicicola* Beijerinck, are peritrichic, grow with relative rapidity on agar plates, and produce very characteristic changes in milk. They produce nodules on the roots of the following plants: Clover, sweet clover, alfalfa, vetch, pea, navy bean, lupine, black locust, *Amorpha*, and *Strophostyles*. The bacteria of the 2nd group are monotrichic, grow slowly on agar plates, and cause no marked change in milk. They have been isolated from cowpea, soybean, peanut, beggar weed, *Acacia*, *Genista*, and *Cassia*. The nomenclature of this latter group is discussed. *Bacillus radiobacter* Beijerinck isolated from legume nodules was studied with the 2 groups of nodule forming bacteria.—*W. H. Burkholder.*

1333. MILLER, H. M. Modification of the Howard method for counting yeasts, spores and bacteria in tomato products. Jour. Indust. Eng. Chem. 12: 766. 1920.—The modification described is based on the fact that by boiling tomato pulp with Loeffler's methylene blue and Tiehl-Neilsen's carbolfuchsin the microorganisms are stained a slightly deeper color than the tomato tissues.—*Henry Schmitz.*

1334. TRUFFAUT, G., ET N. BEZSSONOFF. Sur les caracteres communs au *Bacterium* β , symbiote du *Clostridium* *Pastorianum* de Winogradsky, et au *B. aliphaticum* non liquefaciens

de Tausz et Peter. [On the characters common to *Bacterium* β , the symbiont of *Clostridium* *Pastorianum* of Winogradsky and *Bacterium* *aliphaticum non liquefaciens* of Tausz and Peter.] *Compt. Rend. Acad. Sci. Paris* 171: 1089-1091. 1920.—A comparison is made between the morphological and physiological characteristics of *Bacillus* β , which is a symbiont of *Clostridium pastorianum*, with those of *Bacillus aliphaticum non-liquefaciens*. The conclusion is reached that they are either closely related strains of the same species or that they are the same strain. The chief points of distinction seem to be such as are related to the life habits of the two, symbiosis in the one case and independent development in the other.—*C. H. Farr*.

1335. WINSLOW, C.-E. A., JEAN BROADHURST, R. E. BUCHANAN, CHARLES KRUMWIEDE, JR., L. A. ROGERS, AND G. H. SMITH. The families and genera of the bacteria. Final report of the committee of the Society of American Bacteriologists on characterization and classification of bacterial types. *Jour. Bact.* 5: 191-229. 1920.—The report is divided into 4 sections. In section I, the introduction, reference is made to the preliminary report of the Committee in 1917 and the changes made in that report are noted, namely, (1) the family *Mycobacteriaceae* has been elevated to the rank of an order, *Actinomycetales*, with 2 families, *Actinomycetaceae* and *Mycobacteriaceae*; to the first family have been added 2 genera, *Actinobacillus* and *Erysipelothrix*, the genus *Nocardia* having been omitted; to the second family has been added the genus *Pfeifferella*. (2) The family *Nitrobacteriaceae* has been divided into 2 tribes and the name of the genus *Mycoderma* has been changed to *Acetobacter*. (3) In the *Coccaceae* the genus *Neisseria* has been placed in a separate tribe; the genus *Albococcus* is united with *Staphylococcus*; and the new genera *Diplococcus* and *Leuconostoc* are added. (4) The *Bacteriaceae* are divided into 7 tribes and the new genera *Erythrobacillus*, *Chromobacterium*, *Zopfius*, and *Proteus* are added. (5) The family *Lactobacillaceae* is reduced to the rank of a tribe of the *Bacteriaceae*. In section II are given some specific recommendations, including a list of 16 genera the names of which are recommended for adoption. In section III is given the outline of bacterial classification, including characteristics of the orders, families, tribes, and genera; 38 genera are included with the name of the type species for each genus. Section IV contains an artificial key to the families and genera. Section V consists of a generic index of the commoner forms of bacteria with the names of the common species annexed to their proper generic names.—*Chester A. Darling*.

PALEOBOTANY AND EVOLUTIONARY HISTORY

E. W. BERRY, *Editor*

(See also in this issue Entries 1088, 1101)

1336. BERRY, E. W. Contributions to the Mesozoic flora of the Atlantic Coastal Plain XIV. Tennessee. *Bull. Torrey Bot. Club* 48: 55-72. 1921.—An account of a flora of 135 species of plants recently discovered in the Ripley formation of western Tennessee. The Ripley formation is the latest of the Upper Cretaceous formations of the Mississippi embayment region. The report includes an account of the botanical character, the probable environment, and the correlation of the flora, and gives a list of the forms represented.—*E. W. Berry*.

1337. HARSHBERGER, J. W. Upper Cretaceous floras. [Rev. of: BERRY, E. W. Upper Cretaceous floras of the eastern gulf region in Tennessee, Mississippi, Alabama and Georgia. U. S. Geol. Surv. Prof. Paper 112. 178 p., 33 pl. 1919 (see Bot. Absts. 3, Entry 1600).] *Bot. Gaz.* 68: 482-483. 1919.

1338. HEIM, ARNOLD, AND H. GAMS. Interglaziale Bildungen bei Wildhaus (Kt. St. Gallen). [Interglacial deposits at Wildhaus (Canton St. Gall).] *Vierteljahrsschr. Naturf. Ges. Zurich* 63: 19-33. 1918.—The author gives lists of fossil plants contained in the deposits.—*John H. Schaffner*.

1339. JENNINGS, O. E. Fossil plants from the beds of volcanic ash near Missoula, western Montana. Mem. Carnegie Mus. 8: 385-450. Pl. 22-33. 1920.—The author describes collections made in 1902 and 1905 by EARL DOUGLAS from near Missoula and near Winston in western Montana. The latter is small and the material represents new species of *Equisetum* and *Aralia* but is believed to be the same age as the larger and better preserved collection from the former locality. This includes 21 species, i.e., *Sequoia* 2, *Thuyopsis*, *Sabina*, *Typha*, *Cyperacites*, *Populus* 2, *Juglans*, *Betula*, *Alnus* 2, *Quercus* 3, *Ficus* ?, *Ilex*, *Celastrus*, and *Vaccinium*. Species of *Sequoia*, *Juglans*, *Betula*, *Alnus*, *Quercus*, *Ficus* ?, *Ilex*, *Celastrus*, and *Vaccinium* are described as new.—This flora is regarded as of Oligocene age and as existing around a mountain lake. There is an ecological discussion in which the fossil flora is compared with those of recent lakes in the Montana Rockies, and it is concluded that the Oligocene climate in that region was somewhat warmer than now prevails in that region, and that the plant associations represented ranged from wet meadow to moderately xerophytic oak forests on sandy or rocky lake shores.—E. W. Berry.

1340. JOHNSTON, R. M. Notes on the discovery of a new fossil fruit from the Deep-Lead Tin Drifts at Derby, Tasmania. Papers and Proc. Roy. Soc. Tasmania 1918: 9-10. 1919.—This article reports the discovery of a lignified fossil fruit possibly allied to *Plesiocapparis prisca* F. von Mueller. It is described by the author as a new species under the name *Carpolithes* (*Plesiocapparis*) *Clarkii*.—J. H. Faull.

1341. POTONIE, R. Mitteilung über mazerierte kohlige Pflanzenfossilien. [Notes on the maceration of carbonized plant fossils.] Zeitschr. Bot. 13: 79-89. 12 fig. 1920.—The author describes and figures vertical sections of the stomata of *Thinnfeldia rhomboidalis* Schenk from the Lias (lower Jurassic) of Germany, calling attention to their xerophytic character; the technique of maceration and staining of the fossils is discussed. A specimen of *Callipteris conferta* (Sternberg) Brongniart is described from the Permian (Rothliegendes) of Thuringia which shows that it had been mined by some insect larva.—E. W. Berry.

1342. STOPES, MARIE CARMICHAEL. The missing link in *Osmundites*. Ann. Botany 35: 55-64. Pl. 2, 1 fig. 1921.—A specimen of *Osmundites* from Queensland, Australia, consisting of a piece of rhizome with surrounding leaf bases, was found to have a solid protostele in the stem. All the other features are typical of the genus including the meristemes in the leaf bases. KIDSTON and GWYNNE-VAUGHAN had concluded that the vascular system of the Osmundaceae must have been derived from just such a protostele though no form possessing one was known to them. The specimen described is regarded as the missing form. The plant is given the name *Osmundites Kidstoni*. The horizon is probably Cretaceous.—W. P. Thompson.

1343. TORREY, R. E. Telephragmoxylon and the origin of wood parenchyma. Ann. Botany 35: 73-78. Pl. 3, 3 fig. 1921.—A lignite of Araucarian affinities from the Cretaceous of Texas shows at the end of the annual ring numerous tracheids which are divided into segments. This is considered to be the first stage in the evolution of wood parenchyma from tracheids. The specimens are placed in a new genus *Telephragmoxylon*.—W. P. Thompson.

PATHOLOGY

G. H. COONS, *Editor*

C. W. BENNETT, *Assistant Editor*

(See also in this issue Entries 775, 776, 806, 1026, 1061, 1077, 1095, 1272, 1273, 1275, 1276, 1277, 1279, 1280, 1282, 1293, 1296, 1299, 1301, 1303, 1304, 1311, 1313, 1316, 1328, 1497, 1536)

PLANT DISEASE SURVEY; REPORTS OF DISEASE OCCURRENCE AND SEVERITY

1344. DANA, B. F., AND GEORGE L. ZUNDEL. A new corn smut in Washington. Phytopath. 10: 328. 4 fig. 1920.—The writers note occurrence at Pullman, Washington, of a new

corn smut identical with head smut of sorghum (*Sphacelotheca reiliana*). Symptoms are given in detail.—*W. H. Tisdale*.

1345. FIGUEROA, C. A. The mottling disease of cane and the sugar production of Porto Rico. Jour. Dept. Agric. Porto Rico 34: 35-41. 1919 [1920].—"Where the infection is most intense the sugar production has diminished most heavily." Statistics are presented of the cane acreage and amount of sugar manufactured in Porto Rico in the crops of 1917 to 1919. In Cayey, where the disease is most severe the acreage of 1918 and 1919 was nearly double that of 1917 but the production of sugar was reduced 50 per cent. For the whole island, on the basis of the crop of 1917, the reduction is 30 per cent.—*D. Reddick*.

1346. HAMBLIN, C. O. Downy mildew of the vine. Agric. Gaz. New South Wales 32: 49-50. 3 fig. 1921.—Grape downy mildew was first observed in New South Wales in 1918. The disease appears early in the season but may not make much headway. It overwinters by spores and probably also by hyphal filaments. Notes on control are given.—*L. R. Waldron*.

1347. LINDFORS. [Rev. of: HENNING, ERNST. Anteckningar om gulrosten. [Aufzeichnungen über den Gelbrost.] Centralanst. Försöksv. p. Jordbruksområdet Medd. 192. 1919.] Zentralbl. Ges. Landw. 1: Entry 731. 1920.—Henning's continuation of the list of ERIKSSON and HENNING (*Die Getreideroste*) on yellow rust years, contains an incorrect statement. On page 10, 3rd line from the bottom for "salweizen, Boreweizen," read "Landweizen." Footnote 2 should be struck out.—*D. Reddick*.

1348. MACKIE, W. W. Head smut in sorghum and maize. Phytopath. 10: 307. 1920.—Author notes occurrence of head smut (*Sorosporium reilianum*) of sorghum, and smut of corn in California.—*W. H. Tisdale*.

1349. STILLINGER, C. R. Apple black rot (*Sphaeropsis malorum*) in Oregon. Phytopath. 10: 453-458. 1920.—The first report of *Sphaeropsis malorum* from Oregon and probable occurrence in Washington and California. The fungus is of small economic importance in orchard and storage. Morphological and physiological studies show the necessity of study of strains of *Sphaeropsis* and *Diplodia*.—*R. B. Streets*.

1350. THOMAS, C. C. Coix smut. Phytopath. 10: 331-333. 1 fig. 1920.—Coix smut (*Ustilago coicis* Bref.) is reported in this country for the first time on plants of *Coix lachryma jobi* grown from seed sent from the Philippine Islands.—*G. Wineland*.

1351. TUBEUF, C. VON. Einbruch der Kiefernmistel nach Bayern von Süden. [The invasion of Bavaria from the south by the pine mistletoe.] Naturw. Zeitschr. Forst- u. Landw. 18: 230-232. 1920.—In July 1919, an outbreak of mistletoe on pine was discovered on the southeast slope on the right hand bank of the Loisach between Eschenlohe and Oebrau. In June of 1920, another infected area was discovered on the east side (west exposure) of the Loisach valley between Garmisch and Eschenlohe. The Alps have previously offered an effective barrier to the mistletoe, and there is little doubt but that the parasite was carried across by the thrush. Tubeuf suggests that the infected areas be gone over and the mistletoe removed and destroyed while the infection is still small; further spread would greatly increase the work of suppression. The invasion by this mistletoe resembles that of *Loranthus* of oak, which was brought up from Bohemia through the Elbe Valley by thrushes into Saxony, and is at present unwisely protected by law.—*J. Roeser*.

1352. WEIMER, J. L. The distribution of buckeye rot of tomatoes. Phytopath. 10: 172. 1920.—This disease, caused by *Phytophthora terrestris*, occurred at Arlington, Virginia, in 1919. The known range northward is thus considerably extended.—*W. G. Stover*.

THE PATHOGENE (BIOLOGY; INFECTION PHENOMENA; DISPERSAL)

1353. FAWCETT, H. S. *Pythiacystis* and *Phytophthora* (on Citrus). *Phytopath.* 10: 397-399. 1920.—Cultures obtained from fruit and diseased bark of one type of gummosis of citrus in California were mostly *Pythiacystis citrophthora* Sm. and Sm.; cultures made from diseased bark of "footrot" from various sources all gave *Phytophthora terrestris* Sherbakoff. *Pythiacystis*-like forms were obtained from other hosts in California.—R. B. Streets.

1354. HEDGCOCK, GEORGE G., AND N. REX HUNT. Notes on *Peridermium harknessii*. *Phytopath.* 10: 395-397. 1920.—Field observations of the spread of the aecial stage of *Peridermium harknessii*, apparently without the aid of the telial host, are confirmed by experiments with several species of pine in which a true aecial stage follows inoculation with aeciospores.—G. Wineland.

1355. JAGGER, IVAN C. *Sclerotinia minor*, n. sp., the cause of a decay of lettuce, celery, and other crops. *Jour. Agric. Res.* 20: 331-333. *Pl.* 59, 1 fig. 1920 [1921].—A technical description of *S. minor* with illustrations of apothecia, ascospores, and microconidia. Apothecia and sclerotia of *S. libertiana* are much larger. The fungus causes a decay of lettuce and other plants similar to that produced by *S. libertiana*. It is known to occur in Massachusetts, New York, Pennsylvania, and Florida.—D. Reddick.

1356. MATZ, J. Infection and nature of the yellow stripe disease of cane (mosaic, mottling, etc.). *Jour. Dept. Agric. Porto Rico* 34: 65-82. 1919 [1920].—Cuttings from cane showing mosaic were used for propagating purposes. New shoots from such pieces invariably showed symptoms of the disease. The canker stage of mosaic has been secured in as short a time as 3 months.—Transmission experiments by contact failed. Hypodermic injections of juice from diseased plants gave infection in 4 cases of over 200 trials.—Histological studies of diseased and healthy plants were made. "It seems that a foreign plasmodium-like substance is apparently present in the cells of the yellow-striped cane leaf and the stem tissue." This plasmic substance is more constantly present and in a more defined form in cankered cane stalks. It is associated with reddish streaks that may be seen on the interior of severely affected cane. The plasma mass becomes granular in cut pieces and "after eight days motility was observed in the plasma mass." The substance resembles a plasmodium.—D. Reddick.

1357. PELTIER, GEORGE L. The influence of temperature and humidity on the growth of *Pseudomonas citri*, and of its host plants, and on infection and development of the disease. *Jour. Agric. Res.* 20: 295-323. *Pl.* 47-56. 1920 [1921].—The temperature relations of *P. citri*, in culture, are similar to other pathogenes of the *Pseudomonas* group. The factor of time should receive more consideration. When it is considered, the critical temperature in degrees Centigrade are as follows: Minimum, 5; optimum, between 20 and 30; maximum, about 35; thermal death point, between 49 and 52.—Humidity has little or no influence on the viability of the organisms at low temperatures but at high temperatures it is the limiting factor. With medium humidities "at all temperatures, the organism is viable for the period of the experiment." "Some factor or factors, other than the rapidity of drying, are responsible for these results."—Citrus plants under controlled conditions vary markedly in their reaction to temperature and humidity, especially at low and at high temperatures. The optimum temperature for the plants used lies between 20 and 30°C. This condition, with slight variations, also prevails in the field.—Infection depends on 3 conditions: Free moisture on the host, suitable temperature, host in actively growing condition. The organism is active in the tissue so long as the host cells are active. When the host is forced into dormancy the organism becomes inactive. The "period of initial infection" is defined as the time required by the pathogene after it reaches the host to enter the stomates or tissues about a wound. This may occur on plants which are not growing actively. The "period of incubation" extends from the time of initial infection until there is visible evidence of disease. This period therefore depends on the conditions of the host at the time of, and immediately following, initial infection. Frequency of rainfall and the temperature each in a dual relation determine

the number of infections, the length of incubation, and the severity of the disease.—Environmental conditions play an exceedingly important rôle in the susceptibility and resistance of citrus plants to canker and “the results indicate that it will be necessary to study the behavior of the host plant to its environment and its relation to the causal organism before any scientific selection or breeding for disease resistance can be made.”—Pertinent literature is reviewed and a bibliography of 17 titles is appended.—*D. Reddick.*

1358. RANDS, FREDERICK V., AND LILLIAN C. CASH. Some insect relations of *Bacillus tracheiphilus* Erw. Sm. *Phytopath.* 10: 133–140. 1920.—A few striped cucumber beetles were found carrying the wilt organism internally during the winter. Infection may occur from the mouth parts of wilt-fed beetles for a time after feeding and also when the feces of the same beetles come in contact with fresh leaf injuries involving the vascular system. The organism has been isolated from the viscera of wilt-fed beetles.—*S. P. Doolittle.*

1359. RANDS, FREDERICK V., AND W. DWIGHT PIERCE. A coordination of our knowledge of insect transmission in plant and animal diseases. *Phytopath.* 10: 189–231. 1920.—The writers present a review of the literature dealing with insect transmission of plant and animal diseases, with particular reference to diseases of plants. A distinct correlation is found in the principles which apply to insect transmission in both branches of pathology. Insects may act in 3 general relations to diseases caused by micro-organisms: (1) External transmission in which the infective principle is carried on the external body parts of the insect; (2) insects without carrying infection themselves may cause wounds through which parasite organisms gain entrance; (3) internal transmission in which the organism is taken up and passed unharmed through the body of the insect. The transmission of various fungous, bacterial, and “virus” diseases is reviewed in these relations.—*S. P. Doolittle.*

1360. SAUVAGEAU, C. Sur le parasitisme d'une algue rouge. (*Polysiphonia fastigiata* Grev.) [Concerning the parasitism of a red alga.] *Compt. Rend. Acad. Sci. Paris* 169: 1383–1386. 1919.—Certain marine algae support a varied and abundant flora while others do not. The plants attached to them may be classified as epiphytes or parasites. Most of the endophytic algae are restricted to one host plant or to a relatively small number of host plants. *Polysiphonia fastigiata* is found in dense tufts attached to *Ascophyllum nodosum*, and although it has been described as being merely an epiphyte, the author finds that its structure and development indicate that it is a true parasite. It is rarely found attached to *Fucus platycarpus* and *F. vesiculosus*.—*V. H. Young.*

1361. SMYTH, E. GRAYWOOD. Insects and mottling disease. *Jour. Dept. Agric. Porto Rico* 34: 83–116. 1919 [1920].—The insects which might be associated with the transmission and spread of sugar cane mosaic are described. A “summary of our knowledge of insect-borne diseases of plants occurring in America” is presented in tabular form and includes 18 diseases. Experimental methods are described and experiments with the different species are presented in detail. Infection has been secured on 6 plants. The agents concerned are West Indian cane fly (*Stenocranus saccharivorus*), leaf scale (*Pulvinaria iceryi*), yellow cane aphid (*Sipha flava*), and mealy bugs (*Pseudococcus calceolariae* and *P. sacchari*). A bibliography of insect-borne diseases of plants comprising 53 titles is appended.—*D. Reddick.*

1362. SMYTH, E. GRAYWOOD. An annotated bibliography of Porto Rican cane insects. *Jour. Dept. Agric. Porto Rico* 34: 117–134. 1919 [1920].—Brief abstracts of literature, prepared in connection with work on insect transmission of sugar cane mosaic, are presented. [See also preceding entry.]—*D. Reddick.*

1363. SMYTH, E. GRAYWOOD. List of the insects and mite pests of sugar cane in Porto Rico. *Jour. Dept. Agric. Porto Rico* 34: 135–150. 1919 [1920].—The paper, prepared in connection with a study of insect transmission of sugar cane mosaic, gives for each organism the name, distribution, food plants, injury done, enemies and method of control. [See also the 2 preceding entries.]—*D. Reddick.*

1364. SNELL, W. H. Observations on the distance of spread of aeciospores and urediniospores of *Cronartium ribicola*. *Phytopath.* 10: 358-364. 1920.—The writer records field observations in Wisconsin and New York on natural infections of pine and *Ribes*. He concludes that aeciospores can be blown more than $1\frac{1}{4}$ miles to infect *Ribes*. Dry weather in New York prevented a wide distribution of the disease by urediniospores.—*C. J. Humphrey*.

1365. TUBEUF, C. VON. [Rev. of: CLINTON, G. P., AND FLORENCE A. MCCORMICK. Infection experiments of *Pinus strobus* with *Cronartium ribicola*. Connecticut (New Haven) Agric. Exp. Sta. Bull. 214. 428-459, pl. 37-43. 1916-1918 (see Bot. Absts. 6, Entry 225).] *Naturw. Zeitschr. Forst- u. Landw.* 18: 236-237. 1920.—The reviewer calls attention to his previous contributions on the same subject. He briefly reviews and criticizes the authors' conclusions on the methods of attack of the fungus, and its external manifestations on the foliage.—*J. Roeser*.

1366. WALKER, J. C., AND W. B. TISDALE. Observations on the seed transmission of the cabbage black rot organism. *Phytopath.* 10: 174-177. 1920.—A large percentage of cabbage plants grown from imported seed developed black rot (*Bacterium campestris*). When seed of the same lot was treated with mercuric chloride, the disease was practically eliminated.—*S. P. Doolittle*.

THE HOST (RESISTANCE, SUSCEPTIBILITY; MORBID ANATOMY AND PHYSIOLOGY)

1367. ARTSCHWAGER, ERNST F. Pathological anatomy of potato blackleg. *Jour. Agric. Res.* 20: 325-330. Pl. 57-58. 1920 [1921].—Material for study was taken in arid part of Colorado, U. S. A. Plants affected with black leg show an increase in strongly lignified vascular tissue and a transformation of most of the parenchyma cells of cortex and pith into sclereids. Protein crystals occur in the cells of leaves of affected plants; in healthy plants they have been observed only in peripheral cells of the cortex in tubers.—*D. Reddick*.

1368. COLLINS, J. FRANKLIN. Notes on the resistance of chestnut to blight. *Phytopath.* 10: 368-371. 2 fig. 1920.—Results of observations indicate that the American chestnut (*Castanea dentata*) is developing resistance to blight. The author describes a case in which a young chestnut shoot apparently recovered from the disease.—*Ruth G. Bitterman*.

1369. COLON, E. D. The absorption spectrum of the chlorophyll in yellow-striped sugar-cane. *Jour. Dept. Agric. Porto Rico* 34: 43-46. 1919 [1920].—Leaves from healthy plants and from plants affected with mosaic were used. The absorption spectra from alcoholic solutions of chlorophyll from the two kinds of leaves were alike. "Although the tests above described were not as numerous nor performed with as many solvents as might have been desirable, they warrant the belief that the disappearance of the pigment in yellow-stripe is not primarily due to a decomposition of chlorophyll as such."—*D. Reddick*.

1370. EARLE, F. S. The years experience with sugar-cane mosaic or stripe disease. *Jour. Dept. Agric. Porto Rico* 34: 3-33. 1919 [1920].—An account is given of the lines of activity in Porto Rico since October, 1918, in the study of mosaic. An historical résumé of previous work, with comments upon the researches presented in the same journal by others, is presented. In some cases the comments are more specific or more detailed than those presented by the authors. [See Bot. Absts. 8, Entries 1345, 1356, 1361, 1369, 1378].—*D. Reddick*.

1371. EDSON, H. A. Vascular discoloration of Irish potato tubers. *Jour. Agric. Res.* 20: 277-294. 1920 [1921].—Vascular discoloration of stem-end tissues of Irish potato tubers is not proof of the presence of parasitic fungi. Discolored bundles often are sterile and fungi frequently are isolated from tissues which appear normal.—Out of 3,203 attempts, by plating, to isolate fungi from tubers, all but 161 of which were discolored, 1,352 gave no growth.

In those yielding growth, many organisms were found: Species of *Fusarium*, 720 times; *Alternaria*, 615 times; bacteria, 241 times; *Verticillium*, 147 times; *Penicillium*, 104 times; *Colletotrichum*, 91 times; *Rhizoctonia*, 12 times; miscellaneous, 87 times.—Field trials in Colorado with tubers from widely separated sources indicate that neither vascular discoloration nor fungous invasion of the tissues of the mother tuber is a guaranty of disease in the resulting plants; nor is their absence a guaranty of health. The soil and not the tuber is the more potent source of disease.—Stem-end pieces used for planting yielded slightly higher percentages of diseased plants than did eye-end pieces. Plants showed a marked capacity for recuperation, which varied with the variety, environment, and with the interaction of the two.—*D. Reddick*.

1372. FRACKER, S. B. Varietal susceptibility to false blossom in cranberries. *Phytopath.* 10: 173-175. 1920.—A tabular presentation and brief discussion of varietal susceptibility. The cultural conditions are given, together with inspection practices and control measures.—*R. B. Streets*.

1373. GUYTON, T. L. The chrysanthemum gall midge. *Ohio Agric. Exp. Sta. Bull.* 341. 103-114, 6 fig. 1920.

1374. HAHN, GLENN G., CARL HARTLEY, AND ARTHUR S. RHODES. Hypertrophied lenticels in the roots of conifers and their relation to moisture and aeration. *Jour. Agric. Res.* 20: 253-265. *Pl.* 44-46. 1920 [1921].—Unusual excrescences on the roots of 10 species of *Pinus*, 4 of *Picea*, and of *Abies balsamea*, *Tsuga canadensis*, *Larix laricina*, *Taxus cuspidata*, *T. brevifolia*, and *Araucaria bidwellii*, are found to have the structure of lenticels, much enlarged. They occur and were produced in various kinds of soil in the presence of excessive soil moisture. Hypertrophy occurs on both weak and vigorous plants. It is decreased by top pruning and is increased by root injury.—The literature is reviewed. The belief that excessive soil moisture stimulates lenticel hypertrophy mainly by increasing general sap pressure, and that oxygen hunger is of no importance as a stimulus, is not supported by these experiments. A bibliography of 23 titles is appended.—*D. Reddick*.

1375. HURD, ANNIE MAY. Injury to seed wheat resulting from drying after disinfection with formaldehyde. *Jour. Agric. Res.* 20: 209-244. *Pl.* 36-41. 1920 [1921].—Results of investigations on the post-treatment action of formaldehyde on wheat are recorded. The major conclusion reached is that injury results from the drying of grain treated with formaldehyde solution; that seed wheat is uninjured by a 0.1 per cent solution (1-40) and, if kept moist, may be held indefinitely without injury unless attacked by molds. Neither a 0.1 per cent (1-40) nor a 0.2 per cent (1-20) solution of formaldehyde produces injury if the wheat is germinated immediately. Injury to dried grain is cumulative. Paraformaldehyde is deposited on dried grain, and the gas formed by the volatilization of this solid penetrates the wheat slowly, probably going into solution in the pericarp. The manner of drying and the moisture content of the atmosphere surrounding the grain determine the nature and extent of injury. An atmospheric humidity of over 70 per cent during the storage period prevents injury; one of 70 per cent or less permits injury, which is most severe in the intermediate humidities, gradually decreasing in the lower ones. Treated grain stored in an absolutely dry chamber is almost uninjured. It is considered probable that the formaldehyde does not enter the wheat as a gas or in the solid polymeric form, but in solution in the seed coats. An optimum atmospheric humidity to permit, first, the formation of paraformaldehyde, and, second, the solution of formaldehyde gas in the grain, results in maximum injury from drying after treatment. Injury is minimized by spreading the wheat as it dries so that maximum aeration occurs. Washing the grain with water immediately after treatment entirely prevents post-treatment injury from dry storage.—*L. M. Massey*.

1376. KELLEY, W. P., AND A. B. CUMMINGS. Composition of normal and mottled citrus leaves. *Jour. Agric. Res.* 20: 161-191. 1920 [1921].—Lemon, orange, and grapefruit leaves are similar in composition. As growth of normal orange leaves proceeds the percentages of

potassium and phosphorus, when expressed on the basis of either the ash or the dry matter, and of nitrogen in the dry matter, decrease; the percentages of calcium, however, increase. The concentration of iron is greater in very young leaves, later decreasing slowly. The concentration of the different constituents probably remains practically constant throughout the period of normal maturity. Notable amounts of potassium and nitrogen are translocated back into some portion of the tree as the leaves approach senility just preceding the time of normal dropping. A part of the phosphorus also appears to be removed from the leaf some time preceding normal maturity. The absolute content of magnesium does not decrease as maturity approaches. Maximum amounts of potassium, phosphorus, and nitrogen are contained in orange leaves by the time they are about 6 weeks of age. The absolute content of calcium continues to increase until full maturity is reached. The highly calcareous nature of the orange leaf is its most pronounced characteristic, the dry matter of the mature leaf containing 5-6 per cent of calcium.—The composition of mottled citrus leaves differs from that of normal leaves mainly in that the calcium content is smaller and the potassium, phosphorus, and usually the nitrogen contents are greater. The composition of mottled orange leaves resembles that of immature leaves, although the percentages of ash and nitrogen in the former are materially greater than in the latter. The sap of normal orange leaves becomes increasingly concentrated and acidic, and when mature is especially rich in calcium. The sap of mottled leaves contains sub-normal amounts of calcium and concentrations of potassium and phosphorus fully twice as high as in mature normal leaves. Abnormally large amounts of unionized acids occur in mottle-leaf sap. The composition of leaf spurs of severely mottled trees varies from the normal in much the same way as the leaves; that of the older wood is more nearly normal. The roots appear to contain considerably less than normal amounts of potassium and phosphorus but an approximately normal amount of calcium. The abnormalities in the composition of different parts of mottled citrus trees may be due, in part at least, to the inability of the tree to satisfy its normal calcium requirements at critical periods. The possibility of correlating abnormalities in the composition of mottled trees with conditions conducive to the disease is suggested. The significance of subnormal concentrations of calcium accompanied by supernormal concentrations of potassium and phosphorus in the leaves, especially in relation to the limiting of chlorophyll production, is not known. No causal relationship may exist. If an inadequate supply of calcium conditions the deficiency of chlorophyll, it probably does so indirectly. Mottle-leaf must be produced experimentally before any explanation can be safely accepted. The leaves of affected trees are not suffering from inadequate supplies of potassium, phosphorus, nitrogen, or iron.—*L. M. Massey.*

1377. LEVINE, MICHAEL. Studies on plant cancers—II—The behavior of crown gall on the rubber plant (*Ficus elastica*). *Mycologia* 13: 1-11. *Pl.* 1-2. 1921.—“*Bacterium tumefaciens* inoculated into the apical internode of the branches, into the leaves, or main stem of the rubber tree stimulates the development of a neoplasm in the region of inoculation. The early stages in the development of the crown gall in *Ficus elastica* does not interfere with the life of the plant as a whole nor does it interfere with the growth of the inoculated branches. The crown gall in *Ficus elastica* after a number of months of active growth becomes hard and dry and finally dies. The invasion of the stem by the new growth does not destroy the entire conducting system of the stem, yet that portion of the stem above the gall dies, as well as a considerable portion of the stem below. Cultures made from pieces of the crown gall and stem above the gall yield only a schizomycete which in appearance is not unlike *B. tumefaciens* and which when inoculated into the stem of young geranium and rubber plants produces crown galls in the region of inoculation. It is possible that the crown gall cells or the crown gall forming organisms are responsible for the progressive necrosis of the stem from the gall upward and downward. The death of the plant due to crown gall is at least suggestive of the death caused by malignant growth in animals.”—*H. R. Rosen.*

1378. LÓPEZ DOMÍNGUEZ, F. A. Has “yellow-stripe” or “mottling” disease any effect on the sugar content of cane juice? *Jour. Dept. Agric. Porto Rico* 34: 47-64. 1919 [1920].—From a series of analyses of healthy cane and cane affected with the mosaic disease it is con-

cluded that there is no material reduction in the sugar content of juice from affected plants. When stalks are so severely affected that they are cracked open, fermentation sets in and sucrose is lost.—The juice of diseased cane shows a higher acidity; this is not sufficient to cause inversion except in very acute stages of the disease.—*D. Reddick*.

1379. MELCHERS, LEO E., AND JOHN N. PARKER. Three winter wheat varieties resistant to leaf rust in Kansas. *Phytopath.* 10: 164–171. 2 fig. 1920.—Experiments carried on for 6 years show 3 hard winter wheats, “P762 Kanred,” “P1066,” and “P1068” to be markedly resistant to leaf rust, *Puccinia triticina*. These varieties grown in commercial fields over Kansas retain their resistant qualities.—*H. H. McKinney*.

1380. TOWNSEND, C. O. An immune variety of sugar cane. *Sugar* 21: 305. 1919.—The Kavangire cane and its immunity to the mosaic disease are described.—*C. W. Edgerton*.

1381. TOWNSEND, C. O. Una variedad immune de la caña de azúcar. [An immune variety of sugar cane.] *Sugar* 21: 392. 1919.—A translation in Spanish of an earlier article [see the preceding entry].—*C. W. Edgerton*.

1382. TUBEUF, C. VON. Die Wirtspflanzen von *Peridermium strobil*. [Host plants of *Peridermium strobil*.] *Naturw. Zeitschr. Forst- u. Landw.* 18: 214–215. 1920.—A list of the hosts on which *Peridermium strobil* has been discovered is given: *Pinus Strobus*, *P. Lambertiana*, *P. monticola*, *P. flexilis*, *P. aristata*, *P. cembra sibirica*, *P. cembra alpina*, and *P. peuce*. No case has been observed of an attack on *Pinus excelsa*.—*J. Roesser*.

DESCRIPTIVE PLANT PATHOLOGY

1383. B[ARBER], C. H. The mosaic or mottling disease of sugar cane. *Internat. Sugar Jour.* 23: 12–19. 1 pl. 1921.—A summary of the work on sugar cane mosaic by J. R. JOHNSTON, R. M. GREY, C. W. EDGERTON, F. S. EARLE, G. L. FAWCETT, J. A. STEVENSON, and E. W. BRANDES.—*E. Koch Tisdale*.

1384. CARPENTER, C. W. Hawaii Agricultural Station reports on cane root rot fungus. *Sugar* 22: 20–22. 1920.—The deterioration of Lahaina cane, and its relation to a fungus of the *Pythium* type, are discussed.—*C. W. Edgerton*.

1385. COLON, E. D. La enfermedad de las rayas amarillas. [The yellow stripe disease.] *Sugar* 21: 52. 1919.—A short discussion of the yellow stripe or mosaic disease of sugar cane.—*C. W. Edgerton*.

1386. CUTTING, E. M. [Rev. of: HILEY, W. E. The fungal diseases of the common larch^x xi + 204 p., 73 pl. and diagrams. Clarendon Press: Oxford, 1919 (see Bot. Absts. 7, Entry 1188).] *Sci. Prog.* [London] 15: 146–147. 1920.

1387. EARLE, F. S. La enfermedad del mosaico en Puerto Rico. [The mosaic disease in Porto Rico.] *Sugar* 21: 551. 1919.—A brief discussion of the mosaic disease of sugar cane in Porto Rico is presented.—*C. W. Edgerton*.

1388. EDGERTON, C. W., AND C. C. MORELAND. Tomato wilt. *Louisiana Agric. Exp. Sta. Bull.* 174. 54 p., 19 fig. 1920.—Results are presented of 10 years investigations on the tomato wilt, including laboratory, greenhouse, and field work. The disease shows on all parts of the host plant and during all stages of its development. It is, however, most frequently observed about the time the fruits are developing. The fungus, *Fusarium lycopersici*, enters the plants from the soil. The spores of the fungus will remain alive on tomato seed from fall to spring. The disease develops best on light, fertile soil; it is very rarely found in the alluvial sections of the state. Some substances added to the soil retard the development of the disease. Ten tons of lime to the acre delays the wilt for about 2 weeks or more. The disease develops best when the temperature is comparatively high, the optimum tem-

perature for growth of the fungus being around 29°C. When the temperature remains much below this, the disease does not develop strongly. This is shown by weekly tests made throughout the year. During the winter months, the infection percentage was very low.—Attempts to obtain wilt-resistant strains have given good results. No variety is immune, but the wilt develops much more slowly in some than in others; this slower development enables the more resistant strains to make a satisfactory crop of fruit. Many of the commercial varieties, including the widely grown Stone variety, are extremely susceptible to the disease. Results of variety tests are given. The recommendations for control include rotation, seed bed sanitation, and the use of resistant and early varieties.—C. W. Edgerton.

1389. ELLIOTT, JOHN A. Arkansas cotton diseases. Arkansas Agric. Exp. Sta. Bull. 173. 26 p., 5 pl. 1921.—This is a popular account of Arkansas cotton diseases, with notes on occurrence. "Phoma blight" is described as a new disease.—John A. Elliott.

1390. GESCHWIND, ANDREAS. Das Vorkommen des Hallimasch (*Agaricus melleus* Quél.) in den Bosnisch-herzegowinischen Wäldern. [The occurrence of a honey mushroom in the forests of Bosnia-Herzegowina.] Naturw. Zeitschr. Forst- u. Landw. 18: 182-186. 1920.—*Armillaria mellea* is as common in the more or less natural forests of this province as it is in those of central Europe, but it is less destructive than in the cultural forests of the latter. Under natural conditions, beech and aspen, when in mixture with softwoods, protect the latter by acting as hosts for the disease. Wherever the beech is removed from the forest to make room for softwood reproduction, the result is that the desired reproduction does not come and the softwood falls prey to the fungus. The common practice of opening the forest, when a part of a meadow unit, to induce the growth of grasses, furnishes ideal conditions for the entrance of bark-beetles and the honey mushroom. In the extensive forests of the plains ("Karstwälder"), the physical conditions of the soil furnish less ideal conditions for the spread of the rhizomorphs through the soil than do the other forests.—J. Roeser.

1391. GODFREY, G. H. A seed-borne *Sclerotium* and its relation to a rice-seedling disease. Phytopath. 10: 342. 1920.—The author notes the occurrence of a seed-borne *Sclerotium* of rice in Louisiana and its relation to a seedling blight. The possibility of hot water seed-treatment is suggested.—W. H. Tisdale.

1392. HAHN, G. G. *Phomopsis juniperovora*, a new species causing blight of nursery cedars. Phytopath. 10: 249-253. 1 pl. 1920.—Study of a fungus causing a widespread nursery blight of *Juniperus virginiana* from New York to Kansas indicates that a new species is involved. The fungus is similar to *Phomopsis thujae*, a European form. Greenhouse inoculations on *Thuja* gave positive results, but negative ones were obtained on *Abies*, *Picea*, and *Pinus*.—P. V. Siggers.

1393. HAMBLIN, CHAS. O. Flag smut and its control. Agric. Gaz. New South Wales 32: 23. 1921.—Notes are given on the disease and hints as to its control.—L. R. Waldron.

1394. HARTER, L. L., AND J. L. WEIMER. Sweet potato stem rot and tomato wilt. Phytopath. 10: 306-307. 1920.—The authors report negative results from inoculating sweet potatoes and tomatoes, using respectively *Fusarium lycopersici* from tomatoes and *Fusarium hyperoxysporum* from sweet potato.—William B. Tisdale.

1395. HARTLEY, CARL, AND GLENN G. HAHN. Notes on some diseases of aspen. Phytopath. 10: 140-147. 3 fig. 1920.—The authors describe certain diseases found on the aspen in the Pike's Peak region of Colorado. Much damage to leaves is often caused by *Sclerotinia bifrons*, very little damage by *Melampsora albertensis* but a premature defoliation by *M. medusae*, and a blighting of leaves and lateral twigs by *Marsonia populi*. Twig troubles and cankers on trunk and stem are described but no causal organism has been found. *Fomes ignarius* causes rot and premature death of the aspen.—E. M. Gilbert.

1396. HOWARD, W. L., AND W. T. HORNE. Brown rot of apricots. Univ. California Agric. Exp. Sta. Bull. 326. 73-88. 1920.—The results for one season, using 16 different spray treatments, justify the conclusion that apricot blossoms may be effectively protected from brown rot by spraying the trees once, shortly before they come into bloom, with either lime-sulphur or Bordeaux mixture. The lime-sulphur should be used at the rate of 1 gallon to 9 gallons of water, and the Bordeaux mixture at a strength of 4-5-50 (4 lbs. bluestone, 5 lbs. fresh stone lime, 50 gal. water). The so-called dry lime-sulphur, used at the rate of 12 lbs. to 50 gal. of water, is quite as effective as either of the other 2 sprays. Early winter spraying against the brown rot is useless. Brown rot on the fruit cannot be prevented by cutting out the diseased twigs, but twig blight can be controlled as effectively, and more easily, by removing them in the fall or winter as by cutting them out in the spring.—A. R. C. Haas.

1397. HUBERT, E. E. Observations on *Cytospora chrysosperma* in the Northwest. Phytopath. 10: 442-447. 1920.—The unusually dry summers of 1917, 1918, and 1919 favored the development of *Cytospora chrysosperma* on shade and ornamental trees. It is common and injurious in Montana, Idaho, Wyoming, and Washington on species of *Populus*, *Acer* and *Salix*, *Prunus demissa*, *Sorbus scopulina*, and *Sambucus glauca*. The author produced infection on small plants of *Populus trichocarpa* low in vigor. Control methods consist in selecting resistant species, giving proper care to shade trees, and closely inspecting nursery stock.—C. J. Humphrey.

1398. JOHNSON, JAMES. Fusarium-wilt of tobacco. Jour. Agric. Res. 20: 515-535. Pl. 63-67. 1921.—This previously undescribed disease was found to occur in Maryland, Ohio, and Kentucky. It is characterized by a yellowing and wilting of the leaves, usually followed by death of the entire plant. The vascular system of infected plants is characteristically brown or black. The pathogene concerned is *Fusarium oxysporum* (Schlecht.) Wr. var. *nicotianae* n. var., of which a description is given. The fungus differs somewhat from *F. oxysporum* (Schlecht.) Wr. in morphology, physiology, and pathogenicity. Infection was secured with 2 strains of *F. oxysporum* from potato on tobacco, but not with the tobacco strain on potato. The symptoms of the wilt produced by the potato strain were not identical with those produced by the strain from tobacco. Conditions favoring infection with the tobacco-wilt organism are heavy soil infestation, wounded host tissue, a relatively high soil temperature (28-31°C.), and a susceptible variety. Varieties of tobacco differ markedly in their resistance to the disease. The White-Burley variety is most susceptible, and the Havana Seed and Cuban varieties are among the most resistant. The development of resistant strains within the various susceptible varieties offers the most helpful means of control. Growers are advised not to grow tobacco on infested soils and to avoid the danger of infested seed beds.—L. M. Massey.

1399. MATZ, JULIUS. Gummy disease of sugar cane in Porto Rico. Phytopath. 10: 429-430. 1 fig. 1920.—The author gives the distribution of the gummy disease caused by *Bacterium vascularum*. The variety "Otaheite" is very susceptible to the disease. "Cavenagerie," a less popular variety, is apparently very resistant.—William B. Tisdale.

1400. MATZ, JULIUS. Gummy disease of sugar cane in Porto Rico. Sugar 22: 282-283. 1920.—A description and history of the gummy disease of sugar cane caused by *Bacterium vascularum*.—C. W. Edgerton.

1401. MATZ, JULIUS. La gomosis de la caña de azúcar. [Gummy disease of sugar cane.] Sugar 22: 363-364. 1 fig. 1920.—A translation in Spanish of an earlier publication [see preceding entry].—C. W. Edgerton.

1402. MERKER, GUSTAV. Ein neuer Pilzschädling im Fichtenpflanzgarten. [A new fungus pest in Norway spruce (*Picea excelsa*) nurseries.] Naturw. Zeitschr. Forst- u. Landw. 18: 218-219. 1920.—This new disease was discovered on 4-year spruce in the spring of 1920 in the "Forstverwaltung" Grätz, near Troppau in Silesia, and the causal organism was identi-

fied as *Rhizoctonia violacea*. It is commonly known to attack the roots of various garden plants, such as clover, lucern, beets, etc., and has been known to attack young larch trees. This is the first known attack on spruce. It manifests itself as a dense violet fungus covering on the roots and root collar, which in part peels off as layers, in part adheres firmly. Attacked plants should be immediately removed and the soil strewn over with quicklime and turned under.—*J. Roesser*.

1403. QUANJER, H. M. The mosaic disease of the Solanaceae, its relations to the phloem-necrosis and its effect upon potato culture. *Phytopath.* 10: 35-37. 14 fig. 1920.—Field and greenhouse experiments conducted for a number of years show the mosaic on tobacco, tomato, and potato to be of a similar nature. The mosaic symptoms on the potato become evident the season after infection. Grafting experiments demonstrate the contagious nature of the disease. The experiments indicate that transmission under field conditions is usually through root contact. The author suggests that the disease may be due to a virus but more probably to an ultramicroscopic parasite.—*R. E. Vaughan*.

1404. ROBERTS, JOHN W. The apple-blotch and bitter-rot cankers. *Phytopath.* 10: 353. 1920.—The apple-blotch canker caused by *Phyllosticta solitaria* and the bitter-rot canker caused by *Glomerella cingulata* are discussed from the standpoint of their relation to the host.—*A. J. Riker*.

1405. ROSENBAUM, J. A *Macrosporium* foot-rot of tomato. *Phytopath.* 10: 415-422. 4 fig. 1920.—The fungus, found in Delaware fields and causing a rot at the base of tomato stems, resembles the parasite (*M. solani*) causing the early blight of potato. The pathogenicity of the organism was established. The fungus differs in cultural and morphological characters from the *Macrosporium* causing the nail-head spots on ripe tomato fruit.—*R. E. Vaughan*.

1406. SEDLACZEK. [Rev. of: NEGER, F. W. Die Krankheiten unserer Waldbäume und wichtigsten Gartengeholze. (Diseases of our forest trees and most important ornamentals.) viii + 286 p., 234 fig. Ferdinand Enke: Stuttgart, 1919 (see Bot. Absts. 6, Entry 1280).] Oesterreich. Forts- u. Jagdzeitg. 38: 37-38. 1920.—This book is similar in compass and arrangement to HARTIG's "Diseases of Trees," but brought up to date. It consists of 2 parts—non-parasitic diseases and diseases caused by parasitic plants.—*F. S. Baker*.

1407. SMILEY, EDWINA M. The *Phyllosticta* blight of snapdragon. *Phytopath.* 10: 232-248. 8 fig. 1920.—*Antirrhinum majus* is the only host known to be affected by *Phyllosticta antirrhini*. Symptoms, etiology, and pathological effects of the disease are discussed.—*Ruth G. Bitterman*.

1408. TUBEUF, C. VON. *Rhizoctonia violacea* an Fichten. [*Rhizoctonia violacea* on Norway spruce (*Picea excelsa*).] *Naturw. Zeitschr. Forst- u. Landw.* 18: 233-234. 1920.—Tubeuf refers to an article by MERKER (see Bot. Absts. 8, Entry 1402), and calls attention to the fact that HARTIG reported this fungus as attacking young spruce. Past experiments to produce the perithecium of the fungus were failures, and the experiments, in general, were superficial. Tests by the author of imported, infected plants in 1919 and 1920 planted with healthy stock, resulted in a full recovery of the diseased stock and no attack on the other.—*J. Roesser*.

1409. WOLF, F. A. Bacterial blight of the soybean. *Phytopath.* 10: 119. 5 fig. 1920.—The author describes a disease of soybeans occurring in North Carolina caused by *Bacterium soyae* n. sp. Symptoms of the disease and cultural character of the causal organism differ from those described by F. COERPER. No difference in varietal susceptibility was noted. The organism is believed to be seed borne.—*William B. Tisdale*.

1410. WOLF, F. A. A little known vetch disease. *Jour. Elisha Mitchell Sci. Soc.* 36: 72-85. Pl. 2-6. 1920.—A report on an important disease caused by *Protocoronospora nigri-*

cans and resembling an anthracnose in its effect. Dark, elongated lesions may occur on any part of the plant above ground. The disease is now known to occur in North Carolina, South Carolina, Georgia, Mississippi, Louisiana, Tennessee, and at Ithaca, New York (the type locality). Infection is carried in the seed, which may thus introduce the disease to new fields.—*W. C. Coker*.

ERADICATION AND CONTROL MEASURES

1411. ANONYMOUS. Porto Rico fights cane mottling disease. *Sugar* 22: 208-210. 1920.—A review of recent publications from the Porto Rico Experiment Station on the mosaic disease of sugar cane.—*C. W. Edgerton*.

1412. BOWES, J. OORTWYN. Raising phloem-necrosis and mosaic free potatoes, and a source of infection whose nature has not yet been elucidated. *Phytopath.* 10: 48-49. 1920.—Tubers from selected healthy plants should be planted by the hill-row method with 3 or 4 meters between the rows. The intervening spaces should be planted with other crops. When any plant shows disease all of the same progeny should be discarded. Fields and nursery plots should be widely separated.—*R. E. Vaughan*.

1413. BUTLER, O. On the amount of copper required for the control of *Phytophthora infestans* on potatoes. *Phytopath.* 10: 298-304. 3 fig. 1920.—Spraying experiments with Bordeaux near Durham, New Hampshire, in 1919, showed the amount of copper necessary per acre per annum to control losses from *P. infestans* to be between 24 and 26 lbs. The experiments demonstrated that 1:0.5 Bordeaux was superior to 1:1.—*R. E. Vaughan*.

1414. DETWILER, S. B. Results of white pine blister-rust control in 1919. *Phytopath.* 10: 177-180. 1920.—A summary of the blister-rust control work done in the U. S. A., with detailed statement of cost of *Ribes* eradication.—*Frank T. McFarland*.

1415. EARLE, F. S. Instrucciones para la eradicacion de la enfermedad del Mosaico de la cana. [Instructions for the eradication of the mosaic disease of cane.] *Sugar* 21: 51-52. 1919.—A brief discussion of the mosaic disease of sugar cane and its control by means of selection and rogueing.—*C. W. Edgerton*.

1416. EDGERTON, C. W. A new method of selecting L 511 cane free of the mosaic disease for planting purposes. *Louisiana Planter and Sugar Manufacturer* 65: 252-253. 1920.—Practically a reprint of *Louisiana Agric. Exp. Sta. Bull.* 176 [see following entry].—*C. W. Edgerton*.

1417. EDGERTON, C. W. A method of selecting L 511 cane free of the mosaic disease for planting purposes. *Louisiana Agric. Exp. Sta. Bull.* 176. 7p., 1fig. 1920.—The L 511 variety of sugar cane is more resistant to the mosaic disease than the other common varieties. The disease can be detected upon the stalks of this variety by the presence of red stripes. In selecting healthy cane for seed, the stalks can be selected after being cut and stripped, thus eliminating the difficult field inspection. A 1-year test of this method of selection proved entirely satisfactory.—*C. W. Edgerton*.

1418. GILBERT, ALFRED H. Certified seed inspection in Vermont. *Potato Mag.* 3: 6, 20-21, 26. 1921.

1419. GOUAUX, C. B. Mosaic disease of sugar cane in Louisiana. *Louisiana Planter and Sugar Manufacturer* 65: 269. 1920.—Recommendations for rogueing out diseased plants in sections where the disease is as yet very limited.—*C. W. Edgerton*.

1420. HENNING, ERNST, OCH THORE LINDFORS. Krusbärsmjöldaggens Bekämpande—Studier och Forsök. [Gooseberry mildew control—investigations and experiments.] *Centralanst. Försöksv. Jordbruksområdet Medd.* 208. 51 p. 1920.—The article describes briefly

the first appearance of mildew in Ireland and its subsequent spread into Sweden and other European countries. Digging and burning were the first methods of control advocated. Henning in 1907 reported good results from pruning and spraying. Results with other control methods are discussed. The production of good resistant varieties by means of crosses between European and American varieties is considered possible. The results of spraying experiments with 17 different spray materials are given. The mildew is said to be most severe on bushes grown in moist locations or fertilized with nitrogenous materials. A brief discussion of the quarantine laws in several European countries is given. Control methods advocated include the cutting out and burning of diseased portions in the fall, together with liming and cultivating the bushes. The eradication of nearby wild bushes is advised. In the spring, the tops of plants to be set out should be dipped in 1-40 formalin solution, and plants should be sprayed with a formalin solution. If buds have not started, a 1-40 or 1-60 solution is recommended; but if plants have begun to bud, a 1-100 solution should be used.—*Mr. and Mrs. W. W. Gilbert.*

1421. HOLBERT, J. R., J. F. FROST, AND G. N. HOFFER. Wheat scabs as affected by systems of rotation. *Phytopath.* 9: 45-47. 1919.—A report of a survey of 1500 acres of wheat in 28 fields in central Illinois. Wheat following corn showed considerably more scab (*Gibberella saubinetii* (?)) than when following wheat, oats, or clover in the rotation. In 1 field, wheat following 2 years of corn yielded 25 bushels with 20 per cent scab; wheat following 1 year of corn yielded 33 bushels with 2 per cent scab. The most severe scab infestations were found in low places where trash from the preceding crop had collected.—*C. W. Bennett.*

1422. MURPHY, PAUL A., AND E. J. WORTHY. Relation of climate to the development and control of leaf roll of potato. *Phytopath.* 10: 407-414. 1 fig. 1920.—Hill selections of leaf-roll plants from Prince Edward Island in 1916 were planted in 1917 in tuber units at Charlottetown, Prince Edward Island; Bermuda; and Ottawa, Canada. Plants from the same hills reacted similarly at each station. The next year the Bermuda seed at Charlestown showed 97.5 per cent leaf-roll compared with 60.7 per cent in local stock. Authors suggest wholesale introduction of potato seed from disease-free districts as a practical means of control.—*R. E. Vaughan.*

1423. PEYRONEL, B. Sevrnamento di *Marsonia juglandis* sui rami e polloni del noce. [The overwintering of *Marsonia juglandis* on the branches and shoots of the walnut. *Staz. Sperim. Agrarie Ital.* 53: 168-171. 1920.—The author found in the winter months, on the young branches and twigs of *Juglans*, the conidial form of *Marsonia juglandis*, and suggests a close examination of the branches of infected plants, since these are exceedingly good sources of infection in early spring.—*A. Bonazzi.*

1424. STEVENSON, JOHN A. Control of sugar cane mottling disease. *Sugar* 22: 539-541. Fig. 1. 1920.—An article reprinted from *Jour. Dept. Agric. Porto Rico*. Methods being used in Porto Rico to control the mosaic disease of sugar cane are discussed.—*C. W. Edgerton.*

1425. TICE, C. Seed-potato inspection. *Agric. Jour.* [British Columbia] 5: 276. 1920.

1426. TICE, C. Potato certification in B. C. *British Columbia Dept. Agric. Circ. Bull.* 32. 6 p. 1921.

1427. WALKER, J. C. Experiments upon formaldehyde-drip control of onion smut. *Phytopath.* 10: 323-327. 1920.—Experiments conducted near Racine, Wisconsin, from 1913 to 1918 show that the application of approximately 200 gallons of 1:128 formaldehyde solution per acre gives satisfactory control of onion smut. When the quantity of solution is reduced to 120-150 gallons the writer advises increasing the concentration to 1:64.—*R. E. Vaughan.*

MISCELLANEOUS (COGNATE RESEARCHES; TECHNIQUE, ETC.)

1428. FISHER, D. F., AND C. BROOKS. Drouth-spot and related physiological diseases. Agric. Jour. [British Columbia] 5: 290-293. 6 fig. 1920.—A paper read at the International Fruit Growers' Convention, Vernon, B. C., August 1920. With typical drouth-spot Winesap and Stayman were observed to be most seriously affected, followed by Gano and Ben Davis. Delicious, White Pearmain, and Jonathan do not react in the same way. Although the fruit may become badly shriveled no drouth-spot appears, and with the resumption of irrigation the apples regain normal turgor and mature with merely a certain deficiency in size and "quality." Typical drouth-spot and oozing developed on susceptible varieties before shriveling and the resumption of irrigation. It must, therefore, be due to withdrawal of water and not to sudden resumption of growth on addition of water. "Cork" is always associated with very open or very shallow soils or those markedly deficient in humus. "Apple blister" is probably due to drouth during or immediately following the blossoming period, the remedy being earlier irrigation. "Punk" is a condition somewhat resembling "physiological break-down" in storage and possibly due to intermittent drouth combined with intense sunlight. A drouth-spot accompanied by copious gumming, and resulting in hard bitter spots in the ripe fruit, also occurs in plums and prunes.—J. W. Eastham.

1429. HARTLEY, CARL. Abnormal growth induced by chloral hydrate soil treatment. Phytopath. 10: 334-335. 1 fig. 1920.—Chloral hydrate (0.076 and 0.172 kgm. per sq. m.) applied to the soil before sowing to *Pinus ponderosa* seed produced seedlings with the first needles partially fastened together, as well as showing other abnormalities.—James Johnson.

1430. LEVIN, ISAAC, AND MICHAEL LEVINE. The biological and clinical evidence of the therapeutic value of radium and Röntgen rays in cancer. Ann. Surgery 52: 443-447. Apr., 1918.—In a preliminary study of the effect of Röntgen rays on normal *Ricinus* plants it was found that no injury resulted. *Ricinus* plants inoculated with *Bacterium tumefaciens* and given 6 treatments with Röntgen rays at intervals of 2 days for a period of 2 weeks showed no evidence of infection after 4 weeks, or developed only a minute swelling at the point of inoculation. These minute swellings consisted of typical tumor cells of arrested development. Control plants inoculated from the same sub-culture developed large galls in 4 weeks. The results of these experiments are cited as proof that the effect of Röntgen rays on malignant tumors is an inhibition of the proliferating power of the tumor cells and not their destruction. The therapeutic value of the X-ray treatment before and after operation for cancer is pointed out.—R. Nelson.

1431. LEVINE, MAX. Notes on *Bact. coli* and *Bact. aerogenes*. Amer. Jour. Public Health 11: 21-23. 1921.—It is reported that in making counts of *Bacterium aerogenes* the growth of *B. coli* can be repressed by suitable concentration of crystal violet or brilliant green, and that lowering the concentration of peptone in the medium increases the toxicity of the dyes.—C. A. Ludwig.

1432. MACMILLAN, H. G. A frost injury of potatoes. Phytopath. 10: 423-424. 1 pl. 1920.—Small necrotic areas less than 1 millimeter in diameter are produced on leaves of potato plants. By experimental data the trouble is shown to be due to frost.—H. H. McKinney.

1433. MACMILLAN, H. G., AND L. P. BYARS. Heat injury to beans in Colorado. Phytopath. 10: 365-367. 1 fig. 1920.—The authors report a shrunken and collapsed condition of the stem of bean seedlings which occurred at the ground line. The root systems were found healthy and well developed. No organism was found associated with the affected parts. Meteorological records indicated an air temperature range from 28° F. on June 3 to 104° F. on June 29. The soil temperature 1 inch below the surface registered 113° F. on the latter date. The authors consider the condition described to have arisen from high temperature.—W. B. Tisdale.

1434. NORTON, J. B. S., AND C. C. CHEN. Some methods for investigating internal seed infection. *Phytopath.* 10: 399-400. 1920.—The authors outline a method of seed disinfection consisting in pre-soaking, treating in an alcoholic solution of corrosive sublimate followed by a thorough washing in ethyl alcohol and finally in sterile water.—*H. H. McKinney.*

1435. WEIR, J. R. Note on the pathological effect of blazing trees. *Phytopath.* 10: 371-373. 1920.—The writer records the prevalence of sporophores of various heart-rotting fungi on blazes on resinous and non-resinous species of conifers in Montana and Idaho. Eighty-six per cent more sporophores were found on the resinous group than on the non-resinous group.—*C. J. Humphrey.*

PHARMACOGNOSY AND PHARMACEUTICAL BOTANY

HEBER W. YOUNGKEN, *Editor*

E. N. GATHERCOAL, *Assistant Editor*

(See also in this issue Entries 1020, 1295, 1308)

1436. BEYTHIEN, A., UND H. HEMPEL. Ueber Rangoonbohnen. [Rangoon beans.] *Pharm. Zentralhalle* 61: 295-296. 1920.—Samples (226) of Rangoon beans were examined of which 90 per cent contained less than 0.015 per cent of hydrocyanic acid. Of these, 73 per cent contained between 0.006 and 0.015 per cent of the acid. No sample contained more than 20 mg. per 100 gm.—*H. Engelhardt.*

1437. BEYTHIEN, A., UND H. HEMPEL. Ueber das Vorkommen von Rangoonbohnen im Kleinhandel. [The occurrence of the Rangoon bean in retail trade.] *Pharm. Zentralhalle* 61: 27-29. 1920.—Although the German government has prohibited the importation of the bean on account of some cases of poisoning which had been reported, small quantities of the bean had found their way into Germany. The authors report on analyses carried out with several samples and find that the percentage of hydrocyanic acid in the bean is not by far as great as is generally reported. They found from 0.00075 to 0.0054 per cent in these products. Furthermore, they state, most of the acid is lost in boiling the bean.—*H. Engelhardt.*

1438. BRAUN, HANS. Ueber Quellstifte aus Laminariastielen und Tupeloholz. [Dilating tents made of Laminaria stems and Tupelo wood.] *Pharm. Zentralhalle* 61: 586-591. *Fig. 4.* 1920.—An account of the history of dilating bougies made of the stems of *Laminaria* and Tupelo wood and a microscopical and biologic description of the material are given. It is stated that the stems of *Laminaria hyperborea* Foslie are more suitable for making tents than those of *L. Cloustonia* and *L. stenophylla*. Tents made of Tupelo wood, especially when they are varnished as is usually the case, are of little value, because they possess only a very slight swelling power. Requirements for Laminaria bougies and distinctive characteristics of Tupelo wood bougies are given.—*H. Engelhardt.*

1439. GRIFFITHS, E. L. Cocoa husks as a fodder. *Agric. Gaz. New South Wales* 32: 55-56. 1921.—Review of literature shows that cocoa husks contain alkaloids, theobromin and caffein, which produce lethal effects when husks are fed in normal forage quantity. Husks must be fed sparingly, if at all.—*L. R. Waldron.*

1440. GRIMME, CLEMENS. Ist die Rangoonbohne wirklich giftig oder doch wenigstens als schädlich für den menschlichen Genuss anzusprechen? [Is the Rangoon bean really poisonous or must it at least be considered as a food detrimental to man?] *Pharm. Zentralhalle* 61: 159-166. 1920.—The results of analyses of numerous samples of the bean have shown that the hydrocyanic acid in it averages less than 0.02 per cent, that the acid is lost in boiling the beans with water and that the bean is, therefore, harmless. A few samples showed a rather high percentage of hydrocyanic acid, but these were derived from wild-growing plants. From cultivated plants, beans with considerably less acid are obtained.—*H. Engelhardt.*

1441. GRIMME, CLEMENS. Ueber den Alkaloidgehalt von Herbstzeitlosensamen und ueber das Herbstzeitlosensamen Öl. [The alkaloidal content of Colchicum seed and the fixed oil in Colchicum seed.] Pharm. Zentralhalle 61: 521-524. 1920.—By extracting the seed with ether 17.6 per cent of a light-brown odorless semi-drying oil was obtained which had a pungent taste. The following constants were found: Sp. gr., 0.9176; congealing point, 9°C.; refractive index, 1.4642; acid number, 20.3 (free oleic acid 10.2 per cent); saponification number, 184; iodine number, 128.5; and unsaponifiable substances, 0.71 per cent. The fatty acids obtained from the oil were pale yellow in color, melted at 24°C., congealed at 22.5°C., had a refractive index of 1.4646, a saponification number of 187.6, an iodine value of 131, and an average molecular weight of 300.3. It was also found that the percentage of colchicine in the seeds is in inverse proportion to the weight of the seeds.—H. Engelhardt.

1442. KARLSSON, KARL ALGOT. *Matricaria discoidea* DC. Svensk Farm. Tidskr. 24: 517-521, 533-538. 1920.—*Matricaria discoidea* DC. (*Matricaria suaveolens* Buch., *Chrysanthemum suaveolens* Asch., *Chamomilla discoidea* J. Gay) is recommended as a substitute for the less easily obtainable camomile (chamomile), *Anthemis nobilis*. The paper includes an historical review, the comparative chemical properties, and a macroscopic and microscopic study of the 2 plants.—A. M. Hjort.

1443. MARSH, C. DWIGHT, AND A. B. CLAWSON. *Daubentonia longifolia* (Coffee bean), a poisonous plant. Jour. Agric. Res. 20: 507-513. 1920 [1921].—The seeds of *D. longifolia* (*Sesbania cavanillesii*) of the Leguminosae are very poisonous to sheep. The smallest dose of seed producing death was 0.11 pound per hundredweight of animal. The toxic principle is not named.—D. Reddick.

1444. ROSENTHALER, L. Ueber die Beziehungen zwischen dem Gewicht von Drogen und ihrem Gehalt an giftigen Stoffen. [The relation between the weight of drugs and their content of poisonous principles.] Pharm. Zentralhalle 61: 629-630. 1920.—In an article concerning the relation between the weight of *Colchicum* seeds and the amount of colchicine which they contain GRIMME states that no literature is available on the subject. Rosenthaler, however, claims that the fact that specifically lighter drugs contain a higher percentage of active principles than specifically heavier drugs, has been known for a long time and that the Swiss pharmacopoeia for this reason excludes ergot of more than 25 mm. length. He further states that in many other drugs the amount of active principles is in inverse proportion to the weight, as for instance in bitter almonds, areca nuts, calabar beans, aconite root, belladonna root, etc. [See also Bot. Absts. 8, Entry 1441].—H. Engelhardt.

1445. VESTLIN, CONRAD. *Pimpinella-Saponin*. Pharm. Zentralhalle 61: 77-78. 1920.—*Pimpinella saxifraga* contains about 2.5 per cent of crude saponin and about 1 per cent of pure saponin, which possesses the formula $C_{23}H_{36}O_{18} + 2H_2O$ and, therefore, belongs to the class of saponins of the general formula $C_nH_{2n-10}O_{18} + 2H_2O$. In no other plants of the Umbelliferae have saponins been found.—H. Engelhardt.

1446. VIEHOEVER, ARNO, JOSEPH F. CLEVINGER, AND CLARE OLIN EWING. Studies in mustard seeds and substitutes: I Chinese colza (*Brassica campestris chinoleifera* Viehvoer). Jour. Agric. Res. 20: 117-139. Pl. 10-19. 1920.—Seed imported extensively in U. S. A. as rape seed but offered for sale as mustard seed is really *Brassica campestris chinoleifera* n. var. Means of identification of seeds by microscopic examination are described in detail. Plants have been grown from seed and the characteristics established. The variety is closely related to the colza group (*Brassica campestris*).—The volatile oil obtained from the seed is crotonyl isothiocyanate. It is not a suitable substitute for mustard oil, in respect to either condimental, bactericidal, or medicinal values.—The fixed oil is of the general composition of the rape oils, and amounts to more than 40 per cent. The seed should prove useful as pressed oil cake, the leaves as greens, and the plants as forage.—Full descriptions and illustrations are presented and taxonomic problems discussed. A bibliography of 52 titles is appended.—D. Reddick.

1447. WESTER, D. H. Ueber den merkwürdigen Verlauf der Ureasewirkung eines Soya-bohnenextraktes beim Erwärmen auf 37°. [The peculiar action of the urease in soybean extract when heated at 37°C.] *Pharm. Zentralhalle* 61: 293-295. 1920.—The author found that the action of urease on soybean extract changes considerably when kept at 37°; thus he found that while the urea number (i.e., the number of mg. of urea converted by the urease solution) was 126 on the first day, after 7 days' standing it had been reduced to 47 and after 14 days to 38.2, and had increased after 21 days to 90, declining after 26 days to 85, and after 35 days to 60.3.—*H. Engelhardt.*

PHYSIOLOGY

B. M. DUGGAR, *Editor*

CARROLL W. DODGE, *Assistant Editor*

(See also in this issue Entries 769, 770, 778, 779, 785, 791, 805, 812, 942, 944, 948, 1069, 1116, 1118, 1147, 1163, 1211, 1229, 1357, 1369, 1374, 1375, 1376, 1429, 1430, 1431, 1445, 1447, 1509, 1514, 1518, 1526, 1529, 1533, 1535, 1574.)

GENERAL

1448. CLARK, W. M. The determination of hydrogen ions. 317 p., 38 fig. Williams & Wilkins Co.: Baltimore, 1920.—In his preface the author points out interesting biological and chemical investigations as landmarks in the comprehension and measurement of "acidity," and while recognizing that the hydrogen ion may be a center of great interest because it is a dissociation product of so many compounds with which the biochemist deals, he also indicates that it is a factor which should not be permitted to "obscure possibilities of broader generalizations."—The book is written in response to the need of a detailed exposition of the two methods—colorimetric and electrometric—in daily use to determine hydrogen-ion concentration. Accordingly, Chapter I is concerned with some of the general relations among acids and bases, including a discussion of the P_H scale and buffer action. This is followed by captions (pp. 38-96) in which are presented discussions of the colorimetric procedure, theory of indicators, choice of indicators, buffer solutions, protein and salt errors, and the value and limitations of approximate determinations with indicators. Chapters VIII-XVII deal with the electrometric method, including the theoretical aspects as well as detailed descriptions of the hydrogen and calomel electrodes and electrode vessels, and the potentiometer and equipment, also errors of measurement, and standardization methods. A brief chapter relating to supplementary methods is followed by a more elaborate presentation of "applications" intended primarily for the biochemist and biologist, but considered by the author as merely a "cursory review" and as an index to the bibliography. The bibliography extends over 64 pages and includes some titles as late as 1919 and 1920. There are 9 pages of tables.—*B. M. Duggar.*

1449. THATCHER, R. W. The chemistry of plant life. xvi + 268 p. McGraw-Hill Book Co.: New York, 1921.—This book is intended to serve primarily as a handbook dealing with the constitution of the compounds involved in plant growth, likewise the conditions under which such compounds undergo chemical changes in the protoplasm. After a brief chapter on "plant nutrients," encompassing the mineral nutrients and their roles, the author sets forth in a few pages (chapter 2) on the organic components of plants the significance of the materials to be treated, and classifies the important groups of compounds as follows: The carbohydrates and their derivatives, the glucosides and tannins; the fats and waxes; the essential oils and resins; organic acids and their salts; the proteins; the vegetable bases and alkaloids; and the pigments. Ten of the remaining 16 chapters (150 pages) are devoted to the description and discussion of these groups of substances. These sections are preceded by a chapter on photosynthesis, in which there is elaborated the trend of investigations following BAEYER's suggestion, now frequently known as Baeyer's formaldehyde hypothesis. The remaining 5 chapters deal with enzymes, the colloidal condition, the physical chemistry of protoplasm, accessory stimulating agencies, and adaptations.—*R. M. Duggar.*

PROTOPLASM, MOTILITY

1450. ANONYMOUS. The components and colloidal behavior of protoplasm. *Sci. Amer. Monthly* 2: 271-272. 1920. [From *Science* 51: 595-596. 1920.]

DIFFUSION, PERMEABILITY

1451. KNIGHT, R. C. Plant physiology. *Sci. Prog.* [London] 15: 200-206. 1920.—This is a brief review of some important papers dealing with storage and translocation of the food products in plants.—J. L. Weimer.

1452. MANN, H. An apparatus for continuous dialysis or extraction. *Jour. Biol. Chem.* 44: 207-209. 1920.

1453. MUKERJI, J. N. The excretion of toxins from the roots of plants. *Agric. Jour. India* 15: 502-507. 1920.—The conclusions of FLETCHER (*Mem. Dept. Agric. India, Bot. Ser.* 2³: 1-16. 1908) that plants secrete toxic substances are held to be due to the use in his experiments of too concentrated a solution. Data of experiments with Knop's nutrient solution having a total salt concentration of 0.11 per cent are presented, where wheat, cajanus, and grain were grown. The solution which had previously grown a set of plants supported better growth than did the fresh solution.—J. J. Skinner.

1454. SHULL, C. A. Absorption limits. [Rev. of: HARVEY, R. B., AND R. H. TRUE. Root absorption from solutions at minimum concentrations. *Amer. Jour. Bot.* 5: 516-521. 1918 (see *Bot. Absts.* 2, Entry 547).] *Bot. Gaz.* 68: 486. 1919.

WATER RELATIONS

1455. LANGDON, LADAMA M. Wood structure and conductivity. [Rev. of: (1) FARMER, J. B. On the quantitative differences in the water-conductivity of the wood in trees and shrubs. *Proc. Roy. Soc. London B* 90: 218-250. 1918 (see *Bot. Absts.* 2, Entries 305, 306; 4, Entry 1413). (2) HOLMES, M. G. Observations on the anatomy of ash-wood with reference to water-conductivity. *Ann. Botany* 33: 255-264. 7 fig. 1919 (see *Bot. Absts.* 3, Entry 1109).] *Bot. Gaz.* 68: 483-484. 1919.

MINERAL NUTRIENTS

1456. MOLLIARD, M. Action des acides sur la composition des cendres du *Sterigmatocystis nigra*. [Action of acids on the composition of the ash of *Sterigmatocystis nigra*.] *Compt. Rend. Acad. Sci. Paris* 169: 990-993. 1919.—The author has previously demonstrated that the accumulation of ash in *Sterigmatocystis nigra* is much less when ammonium chloride replaces ammonium tartrate as the source of nitrogen. In both cases the acidity increased during the first period of growth, but when the sugar of the culture medium disappears, acidity decreases when ammonium is used, because of the utilization of the latter. On the other hand, the use of ammonium chloride results in the accumulation of hydrochloric acid, which is not utilized by the fungus. During the first 2 days the amount of mineral utilized by the fungus is more than doubled when ammonium tartrate is used as a source of nitrogen. The author regards this result as due to the effect of hydrochloric acid on the permeability of the fungal cells. By means of analyses of the ash of fungi grown with ammonium tartrate and ammonium chloride as sources of nitrogen, the author finds that the mycelium of *Sterigmatocystis* grown on the ammonium tartrate solution contains ash in about the proportions found in the storage organs of higher plants. Only a small part of the sulphur and magnesium of the culture medium was absorbed, but all the phosphorus and potassium of the solution was recovered from the mycelium. The ash of the fungus grown on the ammonium chloride medium was found to contain reduced amounts of sulphur, potassium, and especially magnesium. The author finds that the presence of hydrochloric acid in the medium reduces the permeability of the plasma membrane in an unequal fashion, the permeability to some substances being notably reduced. Attention is also called to the fact that the morphological

characteristics of the fungus, such as suppression of conidia formation, which may be altered by certain deficiencies of the culture medium, may also be brought about by factors leading to alteration in the permeability of the cells.—*V. H. Young.*

PHOTOSYNTHESIS

1457. GRADENWITZ, A. Carbonic acid gas to fertilize the air. *Sci. Amer.* 123: 549, 557. 3 fig. 1920.—An account is given of some experiments carried out on a commercial scale, in which greenhouses were supplied with purified exhaust gases from blast furnaces. The various plants showed increased growth and yield of fruits of 70 per cent to 180 per cent more than in the case of control plants.—*Chas. H. Otis.*

1458. STOLL, ARTHUR. Ueber die Assimilation der Kohlensäure. [On the assimilation of carbon dioxide.] *Vierteljahrsschr. Naturforsch. Ges. Zurich* 63: 512-543. 1918.—The author gives essentially the following summary: The carbon dioxide diffuses from the intercellular spaces through the cell walls, is brought into a higher concentration by a chemical reaction in the cell, and reaches the chlorophyll in a form especially susceptible to reaction. The carbonic acid as such, or a carbonic acid derivative, is then taken up by the chlorophyll. The chlorophyll molecule with the carbonic acid absorbs light and is surrounded by a specific peroxide enzyme which splits off molecular oxygen. The first free product of assimilation is carbohydrate material whose simplest representative is formaldehyde.—*John H. Schaffner.*

METABOLISM (GENERAL)

1459. ANDERSON, R. J. Composition of inosite phosphoric acid of plants. *Jour. Biol. Chem.* 44: 429-438. 1920.—The composition of phytic acid of plants as determined from the analyses of salts of this acid corresponds to inosite hexaphosphoric acid.—*G. B. Rigg.*

1460. COOK, M. J., V. MIX, AND E. O. CULVYHOUSE. Hemotoxin production by the *Streptococcus* in relation to its metabolism. *Jour. Infect. Diseases* 28: 93-121. 1921.—Hemotoxin (hemolysin) production by *Streptococcus* is due to, and controlled by, conditions that influence the growth of the organism.—*Selman A. Waksman.*

1461. DOBBIN, L. On the presence of formic acid in the stinging hairs of the nettle. *Proc. Roy. Soc. Edinburgh* 39: 137-142. 1919.—Formic acid was demonstrated in the contents of the hairs by its conversion into lead formate, which could be distinguished by means of a polarizing microscope. Filter papers impregnated with barium carbonate were pressed upon nettle leaves. The papers were extracted with water and the filtered extract acidified with phosphoric acid and then distilled. The distillate was acid in reaction and could be converted into the lead salt.—*Joanne L. Karrer.*

1462. HAAS, P. Organic chemistry. *Sci. Prog.* [London] 14: 378-380, 565-567. 1920.—A brief review of some of the more recent literature on this subject among which are papers dealing with the coloring matter of plants and one by DOBBIN (*Proc. Roy. Soc. Edinburgh* 39: 137-142. 1919—see preceding entry) on the active agent in the stinging hairs of nettles.—*J. L. Weimer.*

1463. HAAS, P. Organic chemistry. *Sci. Prog.* [London] 15: 22-24. 1920.—A brief review of a paper by HAWORTH (*Jour. Chem. Soc.* 117: 199. 1920) on the constitution of disaccharides is included.—*J. L. Weimer.*

1464. HAAS, P. Organic chemistry. *Sci. Prog.* [London] 15: 192-194. 1920.—The diastatic properties of formaldehyde, a new theory of carbon dioxide assimilation, and the gas contained in the floats of the giant Pacific kelp are mentioned.—*J. L. Weimer.*

1465. LAPICDUE, LOUIS. Variation saisonnière dans la composition chimique des algues marines. [Seasonal variation in the chemical composition of marine algae.] Compt. Rend. Acad. Sci. Paris 169: 1426-1428. 1919.—*Laminaria flexicaulis* was selected as typical material for this work. Analysis of the carbohydrate content and of the soluble and insoluble ash showed that there is a distinct seasonal variation in the chemical composition of this alga. From the spring equinox until September there is a steady increase in soluble carbohydrates from 1.1 to 33.9 per cent. At the same time there is a decrease in the soluble ash from 28.2 to 13.4 per cent and of the insoluble ash from 7.5 to 4.6 per cent. Soluble carbohydrates increased from the end of winter to summer in the ratio of 2 to 81. The carbohydrates present are mannite [included for convenience in this group] and laminarine. The author suggests that the disappearance of soluble ash with the increase in soluble carbohydrates may be simply an "isotonic substitution."—V. H. Young.

1466. MÖBIUS, M. Über die Farben der Blumen. [On the colors of flowers.] Ber. Senckenberg. Naturf. Ges. Frankfurt. a. M. 49: 108-109. 1919.—In this report of a lecture given in February, 1919, the biological significance of colors in flowers is stated to be an unsolved problem, if insects are color-blind. In producing the various color-effects the following pigments are the only ones involved: Chlorophyll, anthoxanthin, anthocyan, anthochlor, and anthophaein. These occur, however, in many different arrangements.—A. W. Evans.

1467. MOYCHO, VENCESLAS. Recherches sur le rôle physiologique de la saponine. [Investigations concerning the physiological rôle of saponin.] Rev. Gen. Bot. 32: 449-459. 1920.—Investigations were made of the amount of saponin present at different stages of the development of *Saponaria officinalis*. It was found that the relative amount of saponin present was approximately constant until the time of flowering and seed production, when the amounts present decreased. The glucoside was again accumulated in the roots in the autumn and winter after the foliage had died. The author concludes that the glucoside may be utilized by the reproductive organs of the plant. The accumulation does not depend on the emigration of the glucoside from the leaves but is due to its formation in the storage organs of the plant.—J. C. Gilman.

1468. TANRET, GEORGES. Sur la miellée du peuplier. [On the honey dew of poplar.] Compt. Rend. Acad. Sci. Paris 169: 873-874. 1919.—The "honey dew" which collects on the leaves of *Populus nigra* was collected from 6 kilos of leaves and analyzed by appropriate methods to determine its carbohydrate content. Twenty-two grams of "melezitose" were secured from this amount of leaves. "Honey dew" of poplars appears to be formed by the excretion of minute droplets by plant lice.—V. H. Young.

1469. WITZEMANN, E. J. Disodium phosphate as a catalyst for the quantitative oxidation of glucose to carbon dioxide with hydrogen peroxide. Jour. Biol. Chem. 45: 1-22. 1921.—Glucose may be quantitatively oxidized to CO₂ with hydrogen peroxide in the presence of a phosphate mixture. Disodium phosphate plays the rôle of a typical catalyst in the oxidation.—G. B. Rigg.

METABOLISM (NITROGEN RELATIONS)

1470. DAKIN, H. D. Amino acids of gelatin. Jour. Biol. Chem. 44: 499-529. Fig. 1. 1920.—The products of the hydrolysis of gelatin were found to contain 13 amino acids. The ones present in largest amounts were glycine, hydroxyproline, proline, alanine, and arginine.—G. B. Rigg.

1471. JOHNS, C. O., AND C. E. F. GERSDORFF. The globulin of the cohune nut, *Attalea cohune*. Jour. Biol. Chem. 45: 57-67. 1921.—Cohune nut globulin contains all of the basic amino acids known to exist in proteins, being high in arginine and lysine.—G. B. Rigg.

1472. JOHNS, C. O., AND D. B. JONES. Some amino-acids from the globulin of the coconut as determined by the butyl alcohol extraction method of Dakin. Jour. Biol. Chem. 44:

283-290. 1920.—The following amino acids were found in the aqueous solution remaining after the products of hydrolysis had been subjected to butyl alcohol extraction (Dakin's method): Glutaminic acid, 19.07 per cent; aspartic acid, 5.12 per cent; alanine, 2.67 per cent; serine 1.76 per cent.—*G. B. Rigg.*

1473. JOHNS, C. O., AND N. C. WATERMAN. Some proteins from the mung bean, *Phaseolus aureus* Roxburgh. *Jour. Biol. Chem.* 44: 303-317. 1920.—The mung bean contains about 21.74 per cent of protein. This yields 2 globulins distinguished from each other by marked differences in their percentages of the basic amino acids.—*G. B. Rigg.*

1474. JONES, D. B., AND C. O. JOHNS. Hydrolysis of the globulin of the coconut, *Cocos nucifera*. *Jour. Biol. Chem.* 44: 291-301. 1920.—The amino acids resulting from the hydrolysis were determined. Glytaminic acid was the most abundant.—*G. B. Rigg.*

1475. MILLER, E. R. Dihydroxyphenylalanine, a constituent of the velvet bean. *Jour. Biol. Chem.* 44: 481-486. 1920.

1476. PARIS, G. Studi e ricerche sulla biochimica del tabacco. III. Sul metabolismo dell'azoto nello sviluppo della foglia di tabacco. [The biochemistry of tobacco. III. Nitrogen metabolism in the growing leaf.] *Staz. Sper. Agrarie Ital.* 53: 81-96. 1920.—The direct connection existing between nicotine production and nitrogen nutrition was demonstrated by cutting tobacco leaves longitudinally in two equal parts and allowing one part to float on distilled water, while the other was floated upon a 0.25 per cent solution of NH_4Cl in diffuse light. The content of nicotine of the ammonium chloride portions was found in two cases to be 2.22 and 2.01 respectively, while the natural nicotine content of the water portions was 1.88 and 1.54 per cent respectively.—The physiological effect of "topping" is demonstrated. In the natural plant the total nitrogen and also the amide nitrogen (about $\frac{1}{3}$ the total amount) increased from the basal to the 5th whorl, while the nicotine content, averaging $\frac{1}{3}$ the quantity of total nitrogen, diminished. In the "topped" plant total nitrogen and nicotine content run about parallel and the latter is so increased in amount as to exceed total nitrogen, and a low content of amide nitrogen is present.—As for soluble nitrogen, the observation was made that, while in the "topped" plants the greater proportion was in the form of basic and protein substances, in the natural plants the greater part of the soluble nitrogen was in the amidic form. Therefore, "topping" of the plants leads to a modification of the chemical composition of the leaves and the stem with an accumulation of nicotine and strong diminution of amides. According to the author, nicotine is a condensation product, the formation of which is dependent upon the amides, light, and chlorophyll.—*A. Bonazzi.*

METABOLISM (ENZYMES, FERMENTATION)

1477. ARZBERGER, C. F., W. H. PETERSON, AND E. B. FRED. Certain factors that influence acetone production by *Bacillus acetoethylicum*. *Jour. Biol. Chem.* 44: 465-479. *Fig. 1-2.* 1920.—This organism ferments glucose, sucrose, potato starch, and xylose in a peptone-phosphate medium with the production of acetic, formic, and lactic acids, ethyl alcohol, acetone, and carbon dioxide.—*G. B. Rigg.*

1478. BOURQUELOT, EM., ET H. HÉRISSEY. Présence dans le Mélilot et l'*Asperule* odorante, de glucosides fournissant de la coumarine sous l'action hydrolysante de l'émulsine. [The presence in *Melilotus* and *Asperula odorata* of glucosides furnishing coumarine when hydrolyzed with emulsin.] *Compt. Rend. Acad. Sci. Paris* 170: 1545-1550. 1920.—Coumarine is secured by treating the glucosides of these plants with enzymes extracted from them. The same result is obtained if emulsin is used, both sugar and coumarine being formed from the glucosides.—*C. H. Farr.*

1479. BRADLEY, H. C., AND H. FELSHER. Studies of autolysis. VI. Effect of certain colloids upon autolysis. *Jour. Biol. Chem.* 44: 553-561. 1920.

1480. GARINO-CANINA, E. Azione dei fosfati nella fermentazione alcoolica. [The action of phosphates in alcoholic fermentation.] *Staz. Sper. Agrarie Ital.* 53: 67-78. *Fig. 1.* 1920.—A yeast (no. 121) of the collection of the laboratory is cultivated in a medium made up of saccharose, tartaric acid, potassium carbonate, potassium sulphate, magnesium sulphate, calcium chloride, and asparagine to which varying quantities of potassium phosphate have been added before sterilization. [The author does not mention which of the 3 phosphates was used.] After incubation the cultures are filtered and alcohol, acetic acid, and yeast substance are determined and compared with the quantity of carbon dioxide produced. The results obtained are summarized in 2 tables and a graph, whence the conclusions are reached that even a molecular concentration of $0.000052 \text{ PO}_4'''$ is sufficient to bring about a normal development and alcohol formation while a concentration of $0.0104 \text{ mol. PO}_4'''$ gives the best results. When alcohol formation is taken as a standard, it is found that greater concentrations are not quite so favorable, while if the actual weight of dry yeast is considered, then growth is a direct function of phosphate concentration within the limits studied. Experiments made with compressed yeast and dipotassium phosphate in increasing concentrations, as also with acetone yeast (*zymin*), gave results which the author considered confirmatory to the results obtained with living yeast although quite irregular.—A. Bonazzi.

1481. GREY, EGERTON CHARLES. The enzymes of *B. coli communis* which are concerned in the decomposition of glucose and mannitol. Part IV.—The fermentation of glucose in the presence of formic acid. *Proc. Roy. Soc. London B*, 91: 294-305. 1920.—This organism breaks glucose down into 3 groups of products: (1) Lactic acid; (2) acetic acid, alcohol, and succinic acid; and (3) carbon dioxide, hydrogen, and formic acid. Production of lactic acid is not correlated with that of the other groups, which are in turn, however, closely related. This relation, due to the rôle of nascent hydrogen in forming alcohol, is here demonstrated for the first time *in vivo*. The addition of formic acid as calcium formate greatly increases the production of hydrogen and of carbon dioxide, instead of inhibiting their formation.—Paul B. Sears.

1482. KNUDSON, L., AND R. S. SMITH. Secretion of amylase by plant roots. *Bot. Gaz.* 68: 460-466. 2 *fig.* 1919.—Neither *Zea Mays* nor *Pisum arvense* is capable of utilizing soluble starch, nor was there found in any experiment an appreciable secretion of amylase by the roots.—H. C. Cowles.

1483. KOPELOFF, NICHOLAS, AND LILLIAN KOPELOFF. Factors determining the keeping quality of cane sugar. *Louisiana Agric. Exp. Sta. Bull.* 170. 63 p., 1 *fig.* 1920.—This is practically a reprint of several articles appearing in different journals (see Bot. Absts. 4, Entry 1513; 5, Entries 920, 2202) with conclusions regarding the importance of certain species of *Penicillium* and *Aspergillus* in the deterioration of sugar.—C. W. Edgerton.

1484. KOPELOFF, NICHOLAS, AND H. Z. E. PERKINS. The deterioration of Cuban raw sugars in storage. *Louisiana Planter and Sugar Manufacturer* 64: 413-415. 1920.—Cuban raw sugars stored for $5\frac{1}{2}$ months in New Orleans deteriorated to a considerable extent. During the same period there was an increase in the number of microorganisms present.—C. W. Edgerton.

1485. KOPELOFF, NICHOLAS, H. Z. E. PERKINS, AND C. J. WELCOME. Further studies in the deterioration of sugars in storage. *Jour. Agric. Res.* 20: 637-653. 1921.—Bags of Cuban raw sugars of 10 different lots with moisture ratios varying from 0.18 to 0.5 were stored in a large warehouse and were analyzed chemically and bacteriologically at the beginning of storage and after 4 and 8 weeks respectively. There was a loss in polarization in most of the sugars at the end of each period, and this was usually accompanied by a gain in reducing sugars and in moisture content. From the data secured a correlation is established between deterioration and the number of microorganisms present and between deterioration and the moisture ratio. [See Bot. Absts. 7, Entry 1343.]—D. Reddick.

1486. SATAVA, JAN. Alcoholic fermentation in sugar juices. *Sugar* 22:196-198. *Fig. 1-4*. 1920.—[Translated from the report of the Bohemian Technical High School, Prague, by R. V. Keller.] Several strains or species of the genus *Zygosaccharomyces*, closely related to *Z. Barkeri*, are capable of fermenting concentrated solutions of sugar. The fermentation produced is rather vigorous, though the amount of alcohol produced is not large. In one experiment using a 65 per cent sugar solution, 2.69 per cent of alcohol was obtained.—C. W. Edgerton.

1487. WESTER, D. H. Ureasegehalt von holländischen Samen und von verschiedenen Arten Soyabohnen. [Urease content of Dutch seeds and of different kinds of soy beans.] *Pharm. Zentralhalle* 61:377-382. 1920.—A great number of seeds of plants growing in Holland and the Dutch possessions were examined. The seeds of *Cytisus* have a high urea number. In seeds of different species of the same genus the urea number varies considerably in such genera as *Geranium*, *Trifolium*, *Vicia*, and *Phaseolus* for instance. In *Vicia hirsuta*, *V. cracca*, *V. villosa*, *V. angustifolia*, and *V. sativa* no urease was present, while in *V. silvatica* there was a high urea number. Urease was present in all the different kinds of soybeans, as found by the examination of 48 species. Very remarkable was the fact that beans which had been kept for 17 and 31 years still exerted a strong urease action.—H. Engelhardt.

METABOLISM (RESPIRATION)

1488. HAGGARD, H. W., AND Y. HENDERSON. Hemato-respiratory functions. VII. The reversible alterations of the H_2CO_3 : NaHCO_3 equilibrium in blood and plasma under variations in CO_2 tension and their mechanism. *Jour. Biol. Chem.* 45:189-198. 1 *fig.* 1920.—Hemoglobin plays almost as large a part in the transportation of CO_2 as it does in that of oxygen, though it does not itself combine directly with CO_2 to any great extent.—G. B. Rigg.

ORGANISM AS A WHOLE

1489. BRANDT, K. Über den Stoffwechsel im Meere. [Metabolism in the sea.] *Schriften Naturwiss. Ver. Schleswig-Holstein* 17:193-194. 1920.—A report is given here of a lecture on the periodicity of the plankton algae, especially the diatoms. Definite relations are shown to exist between the abundance of these organisms and the amount of certain nutritive substances present in the sea.—A. W. Evans.

1490. KÜSTER, E. Der Rhythmus im Leben der Pflanze. [Rhythm in the life of the plant.] *Ber. Senckenberg. Naturf. Ges. Frankfurt a. M.* 47:69. 1919.—In this report of a lecture delivered in February, 1916, various periodic processes in plants are ascribed, wholly or very largely, to an autonomous rhythm inherent in the organism. Among these processes the following are included: Alternation of growing and resting periods, alternation of day and night positions in many leaves and flowers, the formation of fairy rings by molds, and the development of annual rings in woody plants.—A. W. Evans.

1491. ROGERS, J. B. Studies on the viability of the tubercle bacillus. *Amer. Jour. Public Health* 10:345-347. 1920.—The author describes experiments which go to show that the tubercle bacilli in the dust of hospital wards and in morgues are viable and infective.—C. A. Ludwig.

1492. TUBEUF. Absterben der Ulmenäste im Sommer 1920. [Dying-off of the branches of the elm in the summer of 1920.] *Naturw. Zeitschr. Forst- u. Landw.* 18:228-230. 1920.—This phenomenon was observed to an equal extent in 1918, and is due to the habit, characteristic of the elm, of flowering very abundantly every 2nd or 3rd year. The blossoms appear before the foliage in the spring, and, although the green fruits may temporarily act as leaves before becoming ripe, they deprive the leaf buds of their required nourishment, and, as often happens, the foliage never develops so that the branches, after the fruit drops, are bare. Twigs and branches remain green just as long as they bear foliage,—if the foliage does not develop, the branches die off, or die back to the outermost foliage.—J. Roesser.

GROWTH, DEVELOPMENT, REPRODUCTION

1493. SALISBURY, E. J. [Rev. of: MACDOUGAL, D. T. Hydration and growth. Carnegie Inst. Washington Publ. 297. vi + 176 p., 52 fig. 1920 (see Bot. Absts. 5, Entry 2223).] Sci. Prog. [London] 15: 319. 1920.

MOVEMENTS OF GROWTH AND TURGOR CHANGES

1494. HENDRICKS, H. V. Torsion studies in twining plants. Bot. Gaz. 68: 425-440. 6 fig. 1919.—These studies were made on *Phaseolus multiflorus* and *Tiniaria Convolvulus* with a modified form of auxanometer, the latter being so arranged that the growing internodes were stretched vertically in order to eliminate twining. An estimate of torsional rigidity at different lengths was made, and studies were begun on antidromous torsion. As the internode begins to elongate it twists but little, but later it twists more rapidly; eventually there is a slight reverse twist. Rigidity or resistance to twisting increases but slowly until nearly the end of the period of elongation, when there is a sudden increase. The final increase in rigidity accompanies lignification.—H. C. Cowles.

1495. MÖBIUS, M. Die Pflanze und die Schwerkraft. [The plant and gravity.] Ber. Senckenberg. Naturf. Ges. Frankfurt a. M. 47: 78-79. 1919.—In this report of a lecture on geotropic phenomena the contrast is brought out between the uniformity of the actual sensory organs and the diversity of the responses.—A. W. Evans.

GERMINATION, RENEWAL OF ACTIVITY

1496. CROCKER, WILLIAM. After-ripening and germination of rice. [Rev. of: KONDO, MONTARO. Ueber Nachreife und Keimung verschieden reifer Reiskörner. Ber. Ohara Inst. Landw. Forsch. 1: 361-387. 1919 (see Bot. Absts. 3, Entry 2805).] Bot. Gaz. 68: 484. 1919.

1497. THIEL, A. F., AND FREEMAN WEISS. The effect of citric acid on the germination of the teliospores of *Puccinia graminis tritici*. Phytopath. 10: 448-452. 1 fig. 1920.—Means were sought for shortening the rest period of *Puccinia graminis Tritici* teliospores. Soaking in 1 per cent citric acid hastened after-ripening so that germination occurred in December, January, and February. Spores treated the optimum time (15 minutes) produced sporidia capable of infection.—E. K. Seymour.

1498. WEST, CYRIL. Plant physiology. Sci. Prog. [London] 15: 34-39. 1920.—This paper contains a brief review of the more recent literature on dormancy, or delayed germination of seeds.—J. L. Weimer.

TEMPERATURE RELATIONS

1499. ANONYMOUS. The effect of high temperatures on fruits. Sci. Amer. Monthly 2: 272. 1920.—This is a summary of the results of OVERHOLSER and TAYLOR, as set forth in their article in the Bot. Gaz. 69: 274-296. 1920.—Chas. H. Otis.

1500. LIVINGSTON, B. E., AND H. S. FAWCETT. A battery of chambers with different automatically maintained temperatures. Phytopath. 10: 336-340. 1920.—The water is electrically thermostated at the extremes, the intermediate chambers assuming temperatures determined by the temperature-gradient that exists between the 2 ends.—James Johnson.

RADIANT ENERGY RELATIONS

1501. ANONYMOUS. Plant movement and radiant energy. Sci. Amer. 123: 631. 1920.

1502. PRINGSHEIM, E. G. Vom Lichtsinn der Pflanzen. [Light perception by plants.] Ber. Senckenberg. Naturf. Ges. Frankfurt a. M. 47: 57-58. 1919.—A synopsis of a lecture

on light perception in plants is here given. The various types of phototropic phenomena are described and explained, and the great delicacy of the powers of light perception exhibited by plants is presented.—*A. W. Evans.*

1503. TROENDLE, ARTHUR. Der Einfluss des Lichtes auf die Permeabilität der Plasmahaut und die Methode der Permeabilitäts-Koeffizienten. [The influence of light on the permeability of the plasma-membrane and the method of coefficients of permeability.] Vierteljahrsschr. Naturforsch. Ges. Zurich 63: 187-213. 1918.—The results of an earlier contribution (1910) on coefficients of permeability are confirmed. New experiments, in which the quantity of salt taken up in a given time was determined, confirmed the earlier conclusions. The relations between the coefficients of permeability (μ) and the quantity of salt taken up per minute are theoretically derived.—*John H. Schaffner.*

TOXIC AGENTS

1504. VERSCHAFFELT, ED. Een en ander over de Werking van gasvormige vergiften op planten. [The action of gaseous poisons on plants.] Pharm. Weekbl. 57: 1163-1175. 1920.—The gases may enter the plant by diffusion through the cuticle, which generally covers those organs which have only a limited life; or through the tissue air spaces or the lenticels of the cork tissue, the latter behaving differently with different plants. Trees and shrubs shed their leaves very rapidly when exposed to illuminating gas or the vapors of oil of cloves. Strong quick-acting poisons such as chloroform, hydrochloric acid vapors, and ammonia prevent a meristematic separation of the cells, and the leaves do not fall off until the plant is dead. Some Coniferae with definite cell layers in the needles shed these needles when exposed to chloroform or other poisons. The shedding is the more rapid the more poison is absorbed by the cork. This absorbs in 7 days 334.7 per cent of chloroform, 56.6 per cent of ether, 26.4 per cent of carbon tetrachloride, 176.7 per cent of 10 per cent alcoholic caustic potash solution, and 327.8 per cent of trichloroacetic acid (25 gms. in 10 mls of water). The saponifiable substances in the cutin and suberin appear to play an important rôle in the poisoning of plants by gases. Anthocyan dyes are converted into white isomerids, the color being restored by hydrochloric acid vapors. In some plants enzymes may take an important part in hastening the poisoning. In some cases of poisoning strong odors are developed, for instance, by the action of chloroform on garlic and related plants, where from glucosides present in these plants alkyl sulphides are split off, which can be identified by lead acetate paper.—*H. Engelhardt.*

MISCELLANEOUS

1505. ANONYMOUS. Presence of copper in food plants. Sci. Amer. Monthly 2: 204. 1920.

1506. WILSON, J. K. Device for growing large plants in sterile media. Phytopath. 10: 425-429. 1 fig. 1920.—The seeds are sterilized with calcium hypochlorite and germinated in a short glass cylinder partially imbedded vertically in sterile agar contained in a test tube. After the seeds germinate the cylinder containing agar and seedling is lifted out of the tube and set into the mouth of a large flask which contains sterilized nutrient solution. Maize, peas, and oats have been grown to maturity by this method.—*William B. Tisdale.*

1507. ZERBAN, F. W., AND E. C. FREELAND. The color of sugar cane products and decolorization in factory practice. Sugar 21: 354-359b. 1919.—This is a reprint of Louisiana Agric. Exp. Sta. Bull. 165. 32 p. 1919 (see Bot. Absts. 3, Entry 815).—*C. W. Edgerton.*

1508. ZERBAN, F. W., Y E. C. FREELAND. El color de los productos de la cana de azucar y su decoloracion en la practica azucarera. [The color of sugar cane products and decolorization in factory practice.] Sugar 21: 444-447, 494-499. 1919.—This is a translation of Louisiana Agric. Exp. Sta. Bull. 165 (see preceding Entry).—*C. W. Edgerton.*

SOIL SCIENCE

J. J. SKINNER, *Editor*F. M. SCHERTZ, *Assistant Editor*

(See also in this issue Entries 772, 773, 774, 775, 805, 806, 810, 811, 813, 814, 935, 1087, 1177, 1453, 1582)

INFLUENCE OF BIOLOGICAL AGENTS

1509. COWIE, G. A. The mechanism of the decomposition of cyanamide in the soil. *Jour. Agric. Sci.* 10: 163-176. *Fig. 1-5.* 1920.—The decomposition of cyanamide in the soil has been attributed by certain workers to the action of bacteria. The author finds that his results coincide with those of ULIANI, who holds that cyanamide breaks down to urea by a purely chemical change. Sterile soils were capable of transforming cyanamide to urea but little or no ammonia was produced under such conditions. Urea is broken down to ammonia by a change which appears to be due to the action of soil organisms. Clay soils are more efficient in the breaking down of cyanamide to urea than are sandy soils. A sample of Thanet sand taken from borings through London clay was found capable of breaking down cyanamide even after ignition. This sand was found to have the power of softening water as have zeolites. Following this clue it was found that the effect of adding a definite zeolite, prehnite, to ordinary inert quartz sand was to produce a mixture capable of converting cyanamide to urea. Urea was found to accumulate in sterile soils when cyanamide was added.—V. H. Young.

1510. CRUMP, LETTICE M. Numbers of protozoa in certain Rothamstead soils. *Jour. Agric. Sci.* 10: 182-198. *20 fig.* 1920.—Methods are described for counting the protozoa of soil, which are adaptations of the methods commonly used for estimating soil bacteria. Two soils are dealt with in detail—a well manured arable soil and a soil which had had comparatively small applications of manure. Flagellates, amoebae, and thecamoebae are usually present in these soils in large numbers, and in the trophic condition are practically confined to the top 6 inches of soil. There is a definite inverse relation between the number of bacteria and amoebae. Variations in the water content and temperature of soils as well as the rainfall have no influence on soil amoebae. Soils rich in organic matter are richer in protozoa and especially in amoebae and thecamoebae. A bibliography of 23 citations is included.—V. H. Young.

1511. CUTLER, D. W. A method for estimating the number of active protozoa in the soil. *Jour. Agric. Sci.* 10: 135-143. 1920.—A method is described by which it is possible to estimate the numbers of active protozoa in a soil. The total number of protozoa is first found by a dilution method and a fresh portion of the soil is then treated with 2 per cent HCl (sp. gr. 1.15) overnight. By this means all active forms are killed. A second count by the dilution method gives the number of cystic protozoa in the soil.—V. H. Young.

1512. DAVIS, JOHN J. Miscellaneous soil insecticide tests. *Soil Sci.* 10: 61-75. *Pl. 1-2.* 1920.—In field experiments on the control of the commoner white grubs 1 gallon of 8-10 per cent kerosene emulsion per 6-8 square feet of soil washed in with water, slightly browned the tips of the grass. Sodium cyanide at the rate of 165 lbs. in 12,000 gallons of water per acre appreciably injured cultivated crops like corn but produced no permanent injury to grass. Sodium cyanide treatment was more effective in controlling white grubs than kerosene emulsion or coal tar products.—W. J. Robbins.

1513. KOMP, WILLIAM H. WOOD. The use of carbon bisulfide against the white grub. *Soil Sci.* 10: 15-28. 1920.—The maximum dosage of carbon bisulfide for ordinary lawn and golf-green grasses lies nearer 5 ounces than 1 ounce per square foot. The minimum dosage for the white grub is 1 ounce, and injections should be made about 6 inches apart and below the grubs. The soil should be medium moist to wet.—W. J. Robbins.

1514. MATTHEWS, DONALD J. The determination of ammonia in soil. *Jour. Agric. Sci.* 10: 72-85. 2 fig. 1920.—Various methods of determining ammonia in soils have resulted in figures that are too high due to the simultaneous decomposition of nitrogenous compounds. The author describes and figures "aeration apparatus" with which it is possible to recover large quantities of added ammonia with an accuracy of 98-99.5 per cent in 6 hours and with nearly equal accuracy in 3 hours. For most agricultural purposes an aeration of $1\frac{1}{2}$ hours is sufficient. Highly manured glass-house soils undergo partial decomposition in the cold with magnesia. In such cases a modification of the method is recommended. The complete recovery of added ammonia from a calcareous soil is difficult unless the soil is finely ground.—*V. H. Young.*

1515. PLYMEN, F. J., AND D. V. BAL. The biological aspects of wheat cultivation on embanked soils. *Agric. Jour. India* 15: 289-300. 1920.—Embanked wheat soils were said to be deteriorating giving low yields, and wheat plants grown on them were weak and yellow during the early stages of growth but recovered later. The soils are heavy and sticky, black in color, get very hard, and form tenacious blocks on drying after rains. They possess good powers for ammonification and nitrogen fixation but nitrification proceeds rather slowly. The retarding effect on young wheat plants may be due to lack of available nitrogen or to the presence of some deleterious substance formed under anaerobic conditions. Cultivation and aeration during the monsoon months removes the cause.—*F. M. Schertz.*

1516. PRESCOTT, JAMES ARTHUR. A note on the Sheraqi soils of Egypt. A study in partial sterilization. *Jour. Agric. Sci.* 10: 177-181. Fig. 1. 1920.—During the "sheraqi," or fallow period, in the region of the Nile, the soil becomes extremely dry and greatly cracked. The temperature is maintained at a point near 40°C. for some time. The author shows that this results in partial sterilization of the soil with a great decrease in the number of soil protozoa. Such soils when sampled and moistened up to 20 per cent showed greatly increased bacterial action over soils which were obtained before being subjected to the normal high temperatures and consequent partial sterilization. In partly sterilized soils there was a more rapid accumulation of available nitrogen parallel with that obtained following artificial soil sterilization.—*V. H. Young.*

1517. RUSSELL, E. J., AND E. H. RICHARDS. The washing out of nitrates by drainage water from uncropped and unmanured land. *Jour. Agric. Sci.* 10: 22-43. Fig. 1-6. 1920.—The results secured in a series of drain guages at Rothamstead show that uncropped land persistently loses nitrogen in the form of nitrates but the rate at which the soil loses its power of producing nitrates from its own stock of nitrogenous compounds is relatively slow. At the beginning the first 9 inches of soil contained about 3500 lbs. of nitrogen per acre and yielded about 40 lbs. of nitrogen per acre to the drainage water. At the end of 50 years the soil still contains 2380 lbs. of nitrogen and is giving it up at the rate of 21 lbs. of nitric nitrogen per acre per annum. If the curve showing the rate of fall continued its present course and without further slowing down no less than 150 years would be needed for exhaustion of the nitrogen of the soil. The nitrogen lost from the soil appears in the drainage water wholly as nitrate. The authors find evidence from which they conclude that the subsoil contributes little if anything to the nitrogen content of the soil water. The analyses give no evidence of either the loss of gaseous nitrogen or of nitrogen fixation. The amount of nitric nitrogen in the drainage water is found to be closely related to the amount of rainfall. The months of greatest rainfall, in general October to January inclusive, are the months of greatest nitrate loss. During the last 25 years, 1 inch of water has washed out 1 lb. of nitrogen per acre, and for the 15 years previous to that the rate was 1.1 lb. Soil in situ does not give up its nitrogen as easily as when washed in ordinary laboratory experiments. A close relation between sunshine and soil temperature is revealed and it is found that a period of bright sunshine during the summer months results in an increase in nitrate loss during the succeeding rainy months. The amounts of nitrogen lost and the relation of rainfall, temperature, etc., to nitrate loss are shown in a number of graphs and tables giving the data obtained.—*V. H. Young.*

FERTILITY STUDIES

1518. ANONYMOUS. [Rev. of: NEWMAN, L. F., AND H. A. D. NEVILLE. A course of practical chemistry for agricultural students. Vol. I. 235 p. Cambridge University Press: 1920.] Sci. Prog. [London] 15: 321-322. 1920.

1519. BENNETT, HUGH H. The soils and agriculture of the Southern States. 15 × 20 cm., 399 p., 54 pl., 6 maps (1 colored). The Macmillan Company: New York, 1921.—The important agricultural lands of the southern portion of the United States are described. The various soil types occurring are described and crops best suited for their growth discussed. The soil provinces are grouped into (1) the Atlantic and Gulf coastal plains, (2) the Piedmont plateau, (3) the Appalachian Mountain province, (4) the limestone valleys and uplands, (5) Mississippi bluffs and silt loam uplands, (6) the Great Plains region, (7) central prairie region, and (8) the stream bottom and second bottom soils. The fertilization of the various soil types for specific crops is discussed. In Appendix A the definition of a soil is given together with a classification of soil material by texture. In Appendix B tables are given showing the results of chemical analyses of some representative soils from widely separated localities in the Southern States. In Appendix C a list of publications on soils, soil physics, soil chemistry, soil management, crops, and livestock is given. In Appendix D statistics are given bearing on some of the important farm products of the Southern States.—J. J. Skinner.

1520. COMBER, NORMAN M. A qualitative test for sour soils. Jour. Agric. Sci. 10: 420-424. 1920.—A method is described whereby soils which are acid in nature and for which a lime requirement is indicated can be tested qualitatively. Solutions from such soils when treated with an alcoholic or ether-alcohol solution of potassium thiocyanate produce a coloration varying from an opaque red to pink, which indicates the formation of ferric thiocyanate. This method was tested out on a comparatively large number of acid soils with the result just described.—V. H. Young.

1521. ELLETT, W. B., AND T. K. WOLFE. The relation of fertilizers to Hessian fly injury and winterkilling of wheat. Jour. Amer. Soc. Agron. 13: 12-14. 1921.—In Virginia when acid phosphate or manure is used, the Hessian fly injury is smaller and the yield greater than when manure is not used or when floats are applied in place of acid phosphate.—Fly injury ranges from 4.79 per cent in the manure-acid phosphate plot to 28.96 per cent in the buckwheat-floats-lime plot. The manure plot suffered 10.64 per cent fly injury, which was next to the lowest. Manure has greatly prevented winter killings, as shown by yields. Results show that the element most needed to increase yields and decrease the amount of winter-killing is phosphorus. Practically all Virginia soils are deficient in phosphorus and that element must be supplied before material increases can be secured.—F. M. Schertz.

1522. HARTWELL, BURT L., AND S. C. DAMON. Six years experience in improving a light unproductive soil. Jour. Amer. Soc. Agron. 13: 37-41. 1921.—A Warwick sandy loam in Rhode Island was used. To increase productivity liming and fertilization with phosphate should be first considered. Legumes are beneficial for collecting nitrogen and increasing humus.—F. M. Schertz.

1523. JENKINS, E. H., AND W. L. SLATE, JR. Concerning the use of fertilizers. Connecticut [New Haven] Agric. Exp. Sta. and Storrs Agric. Exp. Sta. Joint Bull. 4. 5 p. 1921.—This paper gives some general principles that may govern the use of fertilizers. Special suggestions are given for the use and purchase of mixed fertilizers and chemicals together with suggestions for applications on mowings, potatoes, corn, tobacco, orchards, and gardens. Facts for calculating formulae are given. The publication is intended for general use.—Henry Dorsey.

1524. LIPMAN, C. B., AND G. A. LINHART. A critical study of fertilizer experiments. Proc. Nation. Acad. Sci. 6: 684-686. 1920.—A preliminary report on a statistical study of the

results of fertilizer experiments at the Ohio and Pennsylvania agricultural experiment stations. Study of the Ohio data shows significant increases in yield on "two-element" and "three-element" plots, but not on "one-element" plots. The authors conclude that, even with the best methods, our present knowledge of the enormous variability of all soils and plants render the data from any given fertilizer plot of value only on that plot, and renders it highly probable that no fertilizer experiment as ordinarily conducted is possessed of sufficient practical value to justify the large expenditure of money, time, and energy involved.—*Howard B. Frost.*

1525. MAQUENNE, L., ET E. DEMOUSSY. Sur la richesse en cuivre de terres cultivees. [The amount of copper in cultivated soils.] *Compt. Rend. Acad. Sci. Paris* 169: 937-942. 1919.—The purpose of the work undertaken was to determine whether or not the copper introduced in soils by use of copper sprays may become injurious to plants. Samples (140) of vineyard and other soils were analyzed and the amount of copper was found to vary from less than 1 milligram per kilo to as much as 250 milligrams in some cases. The amount of calcium did not appear to have any direct bearing on the amount of copper retained by soils, but various soils were variable in their retaining power. In general, vineyard soils which had been subjected to copper sprays over a long series of years were found to contain the greatest amounts of copper. Most of this copper is retained in the first 0.3 meter of soil. Observations on the amount of copper taken up by plants and on the amount of soluble copper in the soil lead to the conclusion that the copper of cultivated soils is not injurious to plants.—*V. H. Young.*

1526. MASONI, G. La reazione alcalina provocata dagli acidi nelle terre in rapporto alla nutrizione delle piante. III. Solubilizzazione dei fosfati nel terreno. [The relation to plant nutrition of the alkaline reaction brought about by soil acids. III. Solubility of phosphates in the soil.] *Staz. Sperim. Agrarie Ital.* 53: 121-137. 1920.—A continuation of researches brought to bear on the question of the complex chemical reactions in the soil, the making soluble of substances insoluble in water, and plant chlorosis. Various mineral or organic acids were allowed to act upon the insoluble phosphates in the presence of an excess of CaCO_3 . The acids used were hydrochloric, nitric, sulphuric, formic, acetic, oxalic, succinic, malic, tartaric, and citric. The influence of the temperature upon the various changes was also studied and it was found that, especially when water was used alone, the solubility of $\text{Ca}_3(\text{PO}_4)_2$ was enhanced by a rise in temperature. The principal result of these investigations is to be found in the fact that in the presence of an excess of CaCO_3 the acids which left more phosphorus in solution were citric and malic, while the stronger acids left smaller quantities of this element in solution. These results are similar to those the author obtained when manganese and iron salts were used instead of calcium compounds. The behavior of the different acids the author ascribes to the OH ion developed, through their interaction with the calcium carbonate, and the influence of this upon the mono or dicalcium phosphate in solution and the resulting precipitation of the tricalcium salt. The presence of this OH ion is regulated by (a) the strength of the acid, and (b) the temperature at which the action takes place. It is concluded that the phenomenon of calcareous chlorosis affecting various species of plants grown on a calcareous soil, to a different degree, may be not only dependent upon a lack of iron but also of phosphorus.—*A. Bonazzi.*

1527. MOUNT, H. A. Fuel or fertilizer? *Sci. Amer.* 123: 498, 509-510. 3 fig. 1920.—A discussion of America's little-known peat bogs and their present utilization.—*Chas. H. Otis.*

1528. OPAZO, ROBERTO. Aplicacion de la cal a los terrenos de cultivo. [Application of lime to cultivated soils.] *El Agricultor [Santiago, Chile]* 5: 48-51. 1920.

1529. SEBELIEN, JOHN. Modern methods for experiments with fertilizers and manures. *Jour. Agric. Sci.* 10: 415-419. 1920.—The extreme variation between trial plots, amounting in some cases to as much as 100 per cent under the same treatment, leads to the conclusion that ordinary field plots are of little scientific value in studies with fertilizers and manures.

Pot experiments are of great value in accurate physiological experimentation but cannot be used to solve many problems connected with fertilizers. Various systems of arranging small plots and checks provide a method of compensating for the natural inequalities to be found in ordinary plots. Systems in vogue in a large number of experiment stations are described.—*V. H. Young.*

1530. STEWART, G. R., AND J. C. MARTIN. Effect of various crops upon the water extract of a typical silty clay loam soil. *Jour. Agric. Res.* 20: 663-667. 5 fig. 1921.—The effects of crops of maize, horse beans, potatoes, turnips, and barley upon the water extract of Yolo silty clay loam was studied. Each crop reduced the concentration of the aqueous extract. The nitrate content was reduced to a very low figure.—Concentration of soil solution is not reduced significantly until the portion of soil sampled is filled with roots.—*D. Reddick.*

1531. WALKER, SETH S. Chemical composition of some Louisiana soils as to series and texture. *Louisiana Agric. Exp. Sta. Bull.* 177. 27 p. 1920.—The chemical analysis of 67 soils and 64 subsoils, representing 27 soil types in the Long Leaf Pine Belt of Louisiana, is given together with a general discussion.—*C. W. Edgerton.*

PHYSICAL INVESTIGATIONS

1532. BOUYOUCOS, GEORGE. Degree of temperature to which soils can be cooled without freezing. *Jour. Agric. Res.* 20: 267-269. 1920 [1921].—Mineral soils may be supercooled to -4.2°C . without freezing; peats and mucks withstand -5°C .; water, gelatin, agar, etc., may be supercooled to -6°C . No definite explanation of the phenomenon is offered but theoretical considerations are presented. "The ability of soils to resist freezing even when their temperature is much below the freezing point throws considerable new light on [biological] questions regarding the temperature of soils in cold seasons."—*D. Reddick.*

1533. COMBER, NORMAN M. The flocculation of soils. *Jour. Agric. Sci.* 10: 425-436. 1920.—This is a study of the effect of calcium salts in the flocculation of soils. Silt is most easily flocculated by calcium salts when the suspension is neutral. The addition of alkali renders the flocculation more difficult. Soil "clay" behaves in an opposite manner and is precipitated from alkaline suspensions more readily than from neutral ones. This behavior suggests that of "emulsoid" colloids and it is suggested that clay particles are protected by emulsoid colloids and so behave like them. If this is true, the action of lime is seen to be in accordance with the known facts of colloidal chemistry. Clay as an emulsoid is conceived to protect larger particles which are "suspensoid" in nature. Thus clay imposes its emulsoid nature on soil aggregates and thus on the whole soil. Fine silts are lacking in "emulsoid" clay to protect the larger "suspensoid" particles and are consequently not flocculated by calcium hydroxide.—*V. H. Young.*

1534. HOAGLAND, D. R., AND J. D. MARTIN. Effect of season and crop growth on the physical state of the soil. *Jour. Agric. Res.* 20: 397-404. 1920 [1921].—"The physical state of certain soil constituents is influenced to a marked degree by the concentration of the soil solution. The colloidal condition of the soil suspension undergoes significant alterations during the season. A large increase in colloidal matter is noted when the soil solution is depleted as a result of absorption of solutes by the plant."—*D. Reddick.*

1535. KEEN, BERNARD A. The relations existing between the soil and its water content. A résumé of the subject. *Jour. Agric. Sci.* 10: 44-71. 1 fig. 1920.—A review of the subject, with numerous citations, is presented. Emphasis is laid on the colloidal nature of soil and the necessity of attacking the problem of soil moisture from this point of view.—*V. H. Young.*

1536. MORETTINI, A. Un decennio di ricerche sull'arrabbiaticcio. [Ten years of study upon the subject of "arrabbiaticcio."] *Staz. Sperim. Agrarie Ital.* 53: 146-171. 1920.—The condition of the soil that receives in Italy the name of "arrabbiaticcio" and in France the name of "terre-gatee" has been known in Europe since the time of the Romans and was described

by Columella and Catone. It has been ascribed to the untimely cultivation of a soil, moist in the upper strata and dry in the lower, after a recent limited rainfall. The plants growing therein bear very few seeds and assume a rigid and starved appearance some time after the cultivation. The present author after long periods of study has not succeeded in reproducing the condition experimentally.—*A. Bonazzi.*

1537. OGG, WILLIAM GAMMIE, AND JAMES HENDRICK. *Studies of a Scottish drift soil. Part II.* Jour. Agric. Sci. 10: 333-342. 1920.—Part II of this series deals with the absorptive power of the soil and its mechanical fractions. The soil studied is a glacial drift soil from granitic rocks and is in a comparatively undecomposed state. It contains no carbonate of lime and has a comparatively small clay fraction; about 9 per cent of organic matter is present. This soil, known as "Craibstone" soil, has a considerable absorptive power for ammonia from a solution of sulphate of ammonia. The absorptive power per unit weight of the fractions increases with the decrease in size of the particles, reaching a maximum in clay. Fine silt and ordinary silt have a high absorptive power, probably partly due to organic matter. It appears probable that both the amount of surface exposed and the chemical nature of the soil are important in determining its absorptive power. The small amount of clay present indicates that much of the absorptive power is due to silt. [See following abstract.]—*V. H. Young.*

1538. OGG, WILLIAM GAMMIE, AND JAMES HENDRICK. *Studies of a Scottish drift soil. Part III.* Jour. Agric. Sci. 10: 343-357. 3 fig. 1920.—This section deals with the absorptive power of powdered granite and a comparison with "Craibstone" soil. It was shown that powdered granite has a considerable adsorptive power which compares favorably with that of "Craibstone" soil [see preceding entry]. Adsorption does not increase proportionately with the increase in area of finer fractions; it increases at a lower rate. The effect of ignition is to reduce the absorptive power and this effect is more marked with soil fractions. Absorbed ammonia is only gradually washed out by water and cannot be completely removed in this way. Adsorption by powdered granite and little-weathered soils appears to be principally a phenomenon of adsorption. [See preceding abstract.]—*V. H. Young.*

TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, *Editor*

E. B. PAYSON, *Assistant Editor*

(See also in this issue Entries 769, 953, 957, 1085, 1212, 1446)

GENERAL

1539. BARNHART, JOHN HENDLEY. The so-called generic names of Ehrhart's *Phytolacium*. *Rhodora* 22: 180-182. 1920.—A criticism of the use of Ehrhart's so-called generic names, as such, by certain American authors. The present author shows by quotations from Ehrhart, and from OEDER who first originated the idea of such names, that these were first proposed as "nomina usualia" for non-botanical conversational use and "had no connection or relation to classification, to genus, or to specific relationship."—*James P. Poole.*

1540. BURKILL, I. H. Notes on Cola trees in the Economic Garden, Singapore. *Gardens' Bull. Straits Settlements* 2: 74-86. 1 fig. 1918.—The author gives a history of the Cola trees in the above Garden, where they were introduced in 1879, their growth and production. He adopts the nomenclature of CHEVALIER and PERROT as expounded by them in "*Végétaux utiles de l'Afrique tropicale française*," VI, 1911. They claim that the *Sterculia acuminata* Beauv. of Benin is a small bushy tree 7 or 8 feet in height and does not produce the Kola Nut of Sierre Leone, which is the Kola of commerce, or but a very small part of it; that the tree which produces the larger part of the Kola Nut of Sierre Leone is 40 feet in height and is

Sterculia nitida Vent. The former produces Kola Nuts with 3 or more cotyledons and the latter those with only 2 cotyledons. Under the genus *Cola* these species are known respectively as *C. acuminata* (Beauv.) Schott & Endl. and *C. nitida* (Vent.) Schott & Endl. Three known varieties of the latter are given, namely, var. *alba*, var. *rubra*, and var. *mixta*. The fruit and seeds are illustrated and fully described. The active principles and chemical composition are given and also elaborate notes on the trade, cost of drugs and chemicals during the war, cultivation, yields, and properties.—*Oliver A. Farwell.*

1541. KOPS, JAN, F. W., VAN EEDEN, EN L. VUYCK. *Flora Batava. Afbeelding en Beschrijving der Nederlandsche Gewassen.* [Flora of Batavia. Illustrations and descriptions of the plants of Holland.] 402e-405e Aflevering. Pl. 2001-2016. Martinus Nijhoff: 's-Gravenhage, 1920.—The vascular plants illustrated and described in the present parts are: *Agrostis scabra* Willd., *Dipsacus laciniatus* L., *Lepidium bonariense* L., *Phalaris praemorsa* Lam. & DC., *Rubus procerus* P. J. Müll., *R. rubicundus* P. J. Müll. & Wirtg., *R. Wahlenbergii* Arrh., and *Rumex fennicus* Murbeck. The non-vascular plants included are: *Boletus felleus* Bull., *Cyphella capula* Holmsk., *Hygrophorus agathosmus* Fr., *Pleurotus mitis* P., *Polyporus leucomelos* P., *Russula fellea* Fr., *Sistotrema confluens* Fr., *Tricholoma Russula* Schaeff., and *Xylaris Guepini* (Fr.) Ces. [See Bot. Absts. 1, Entry 635; 5, Entry 2347; 7, Entry 1457; 8, Entry 1298.] —*J. M. Greenman.*

1542. [NORSTEDT, C. T. O.] [Swedish rev. of: BEAUVERD, G. *Monographie du genre Melampyrum.* (Monograph of the genus *Melampyrum*.) Mem. Soc. Phys. et Hist. Nat. Genève 38: 291-637. 31 fig. 1916-1917.] Bot. Notiser 1918: 159. 1918.

1543. [NORSTEDT, C. T. O.] [Swedish rev. of: LINDMAN, C. A. M. *Svensk Fanerogamflora.* (Swedish Phanerogam-flora.) 8 vo., viii + 639 p., 330 fig. 1918.] Bot. Notiser 1918: 306-308. 1918.

1544. OSTERHOUT, GEO. E. *Rocky Mountain botany and the Long expedition of 1820.* Bull. Torrey Bot. Club 47: 555-562. 1920.—An account is given of the work of Dr. E. P. JAMES of the Long Expedition with the itinerary of the expedition and a list of the new species collected.—*P. A. Munz.*

1545. VUYCK, L., EN H. C. VAN DE PAVORD SMITS. *Naamlijst der Nederlandsche Gewassen afgebeeld en beschreven in deel I-XXV der Flora Batava.* [Index of the plants of Holland illustrated and described in parts I-XXV of the Flora of Batavia.] 12 × 19 cm., 131 p. Martinus Nijhoff: 's-Gravenhage, 1920.—This index is an alphabetical list of the scientific and common names of the plants included in the first 25 parts of the "Flora Batava."—*J. M. Greenman.*

PTERIDOPHYTES

1546. MOXLEY, G. L. *Notes, chiefly nomenclatorial, on southern California ferns.* Bull. Southern California Acad. Sci. 19: 56-57. 1920.—Two new combinations of ferns, *Thelypteris normalis* (C. Chr.) Moxley and *Thelypteris arguta* (Kaulf.) Moxley, are given.—*Roxana Stinchfield Ferris.*

SPERMATOPHYTES

1547. ANONYMOUS. *Poa omeiensis.* Jour. Botany 58: 295. 1920.—*Poa omeiensis* Rendle (Jour. Botany 58: 25, 1920) is an abortive name, hence should be replaced by *P. szechuensis* Rendle.—*K. M. Wiegand.*

1548. ANONYMOUS. *The name Alsine.* [Rev. of: SPRAGUE, T. A. *Stellularia* or *Alsine.* Bull. Misc. Inf. Kew 1920: 308-318. 1920.] Jour. Botany 58: 294. 1920.

1549. ASHE, W. W. *Notes on trees and shrubs of eastern North America.* Bull. Torrey Bot. Club 47: 581-582. 1920.—*Prunus allegheniensis* Porter is shown to extend as far south

in distribution as Virginia and West Virginia; a shrubby form of *Azalea arborescens* Pursh is discussed, which grows at Great Falls, Virginia; and *Azalea neglecta* sp. nov. is described.—P. A. Munz.

1550. BREWSTER, A. A. Flowers of *Haemodorum*, blood root. Australian Nat. 4: 152. 1920.—A semi-popular note on the form and number of the floral parts. The flower opens to a very limited extent, but pollination by "honey lovers" is inferred from the nectaries. Size and color are referred to only as "this seemingly insignificant 'black' flower." If black, it is striking.—T. C. Frye.

1551. DAVIDSON, A. New or noteworthy additions to the flora of southern California. Bull. Southern California Acad. Sci. 19: 54-56. 1920.—With distributional notes of various flowering plants there is a description of a new species, *Allium montigenum* Davidson.—Rowana Stinchfield Ferris.

1552. FERNALD, M. L. *Rubus recurvicaulis* Blanchard, var. *armatus* n. var. *Rhodora* 22: 168. 1920.—This new variety strongly simulates *R. tardatus* Blanchard, in its bristly inflorescence, but has the leaflets broader and rounded at the base as in typical *R. recurvicaulis* which occurs with the variety, and to which it intergrades. Specimens have been collected in Newfoundland, Miquelon, and Cape Breton.—James P. Poole.

1553. FERNALD, M. L., AND K. M. WIEGAND. Studies of some boreal American *Cerastiums* of the section *Orthodon*. *Rhodora* 22: 169-179. 1920.—Pursuant to their studies of Newfoundland and Labrador collections of *Cerastium*, the authors here publish the result of their investigations of the American species of the section *Orthodon*, the plants of which have passed in America under the composite species *C. alpinum* L., *C. vulgatum* L., and *C. arvense* L. They recognize the following species, varieties, and forms: *C. alpinum* L., *C. alpinum* var. *legitimum* Lindblom, *C. alpinum* forma *pulvinata* Simmons, *C. alpinum* var. *glanduliferum* Koch., *C. alpinum* var. *glutinoso-lanatum* Facchini., *C. alpinum* var. *lanatum* (Lam.) Hegetschw., *C. Beeringianum* Cham. & Schlecht., *C. Beeringianum* var. *capillare* n. var., *C. Fischerianum* Seringe, *C. arcticum* Lange, *C. Earlei* Rydberg, *C. terrae-novae* n. sp., *C. terrae-novae* forma *Waghornei* n. f., *C. unalaschkense* Takeda, *C. vulgatum* L., *C. vulgatum* var. *hirsutum* Fries., and *C. arvense* L. Bibliography and synonymy are given except for the last species. In this case the authors state that all their attempts to reduce the species-complex to definite species or varieties with natural ranges have proved futile.—James P. Poole.

1554. GODFREY, M. J. The problem of the British marsh orchids. Jour. Botany 58: 286-290. 1920.—*Orchis latifolia* was studied at Vence, Alpes Maritimes, France, last May where *O. maculata* was entirely absent. Instead of a large proportion of plants with unspotted leaves and a wide variation in the markings of the lip very little of either peculiarity was found. The spots were almost always present, and were either ringed or solid. The author is convinced that *O. latifolia* of this region is identical with the spotted-leaved marsh orchis of Great Britain. *O. latifolia* in Vence is certainly not a hybrid of some species with *O. maculata*, which is absent. The suggestion that *O. praetermissa* Druce is the true *O. latifolia* has no foundation. The spotted leaved British marsh orchis is probably simply *O. latifolia*, and not a hybrid. Confusion has arisen through the erroneous identification of hybrids as *O. latifolia*. With the recognition of *O. latifolia* as a species the problem of the British marsh orchis is much simplified. The question as to whether there are unspotted forms of *O. latifolia* distinct from *O. praetermissa* remains unsolved.—K. M. Wiegand.

1555. HEMSLEY, W. B. [Rev. of: MAIDEN, J. H. A critical revision of the genus *Eucalyptus*. Vol. 2, parts 8-10; Vol. 3, parts 1-8; Vol. 4, parts 1, 3, 5-10 (parts 18-28, 31, 33, 35-40 of the complete work). W. A. Gullick: Sydney, 1913-1920.] Nature 106: 45. 1920.—See Bot. Absts. 1, Entry 806; 2, Entry 1355; 3, Entries 1308, 2995; 7, Entry 1464.

1556. HERVEY, E. WILLIAMS. A rare variety of *Vitis labrusca*. *Rhodora* 22: 183-184. 1920.—Report of a white variety of *V. labrusca* found on sale in the New Bedford market and traced to a vine growing in the woods near the town of Rochester, Massachusetts. Report of the same variety in the woods in Westport. Editor's note refers this grape to the "White Fox," *V. labrusca* var. *alba*, found wild in the woods at York, Pennsylvania.—James P. Poole.

1557. JANSSEN, P., EN W. H. WACHTER. Floristische aantekeningen xvi. *Glyceria*, R. Br. [Floristical notes xvi. *Glyceria* R. Br.] *Nederland. Kruidk. Arch.* 1919: 317-325. 1919.—The occurrence and description of species, varieties, and hybrids of the genus *Glyceria* in the Netherlands are given.—J. C. Th. Uphof.

1558. JENNINGS, O. E. New or noteworthy plants from northwestern Ontario. *Jour. Washington [D. C.] Acad. Sci.* 10: 453-460. 1920.—From collections made by the author and Mrs. O. E. JENNINGS in Ontario to the north and northwest of Lake Superior the following new species and varieties are described: *Lysias orbiculata* (Pursh) Rydb. var. *pauciflora*, *Kneiffia depauperata*, *Pyrola uliginosa* Torr. var. *gracilis*, *P. compacta*, *P. chlorantha* Sw. var. *revoluta*, *Scutellaria lateriflora* L. var. *axillaris*, *Stachys palustris* L. var. *puberula*, *S. palustris* L. var. *macrocalyx*, *S. palustris* L. var. *nipigonensis*.—E. B. Payson.

1559. LEWTON, F. L. The history of kidney cotton. *Jour. Washington [D. C.] Acad. Sci.* 10: 591-597. 2 fig. 1920.—An account of its nomenclature. The name *Gossypium lapideum* Tussac, published in 1818, is accepted.—Helen M. Gilkey.

1560. MACCAUGHEY, VAUGHAN. The Mangrove. *Amer. Bot.* 25: 42. 1919.—*Rhizophora Mangle* L. is not native to the Hawaiian Islands but has been introduced near Honolulu where it has increased, suggesting that it would be a desirable species for planting on the coast. The species is also described and its uses given.—W. N. Clute.

1561. MACKENZIE, KENNETH K. Scientific names applicable to our purple-flowered Eupatoriums. *Rhodora* 22: 157-165. 1920.—In referring to K. M. WIEGAND's article "Eupatorium purpureum and its allies" (*Rhodora* 22: 57), the author is in accord with the latter's conclusions that there are 4 distinct and well-marked species in this group but is not in agreement with him when it comes to applying names occurring in botanical literature to the various species recognized. The present author gives the 4 species numbers in the same way as done by Wiegand and discusses at some length the problem of the identity of each.—James P. Poole.

1562. MOXLEY, GEORGE L. *Zauschneria orbiculata* n. sp. *Bull. Southern California Acad. Sci.* 19: 30. 1920.

1563. NAKAI, TAKENOSHIN. Notulae ad plantas Japoniae et Coreae XX. [Notes on the plants of Japan and Corea. XX.] *Bot. Mag. Tôkyô* 33: 41-61. 1919.—Besides brief miscellaneous notes the following new species and varieties are described and new combinations made: *Carex daisenensis*, *Salix meta-formosa*, *S. orthostemma*, *S. sericeo-cinerea*, *S. sericeo-cinerea* var. *lanata*, *Alnus borealis* Koidzumi var. *koreana* (A. *japonica* Siebold & Zucc. var. *koreana* Callier), *A. borealis* Koidzumi var. *latifolia* (A. *japonica* Siebold & Zucc. var. *latifolia* Callier), *A. borealis* Koidzumi var. *paniculata* (A. *paniculata* Nakai), *A. japonica* Siebold & Zucc. var. *rufa*, *A. vermicularis*, *Betula Schmidtii* Regel var. *lancea*, *Parietaria coreana*, *Polygonatum lyratum*, *Rheum coreanum*, *Melandrium umbellatum*, *Clematis subtriflora*, *C. subtriflora* var. *tennuiifolia*, *C. ochotensis* Poir. var. *ternata*, *Isopyrum insigne*, *Pulsatilla nivalis*, *Thalictrum osmorrhizoides*, *T. spirostigma*, *C. Maximowicziana* (C. *speciosa* Maxim.), *Arabis ligulifolia*, *Barbarea sibirica* (B. *vulgaris* R. Br. var. *sibirica* Regel), *B. hondoensis*, *Cotyledon filifera*, *Astilbe chinensis* (Maxim.) Franch & Savat. var. *formosa*, *A. chinensis* (Maxim.) Franch. & Savat. var. *paniculata*, *A. hachijoensis*, *Spiraea pseudo-crenata*, *Sorbus amurensis* Koehne var. *rufa*, *Potentilla chinensis* Seringe var. *littoralis*, *P. chinensis* Seringe

var. *pseudo-chinensis*, *Astragalus setsureianus*, *Phellodendron molle*, *Acer palmatum* Thunb. var. *pilosum*, *A. pictum* Thunb. var. *horizontale*, *Tilia amurensis* Komarov var. *rufa*, *T. amurensis* Komarov var. *koreana*.—E. B. Payson.

1564. OMANG, S. O. F. *Hieracium*-Sippen der Gruppe Alpina aus dem südlichen Norwegen. III. [Hieracium forms of the group Alpina in southern Norway.] *Nyt Mag. Naturvidenskaberne* 56: 69-106. 1919.—Studies of *Hieracium* during July-August 1913 in mountain districts has resulted in the publication of the following new species: *H. applicans*, *H. callianthum*, *H. dissotocum*, *H. excretum*, *H. eucalpideum*, *H. euphyllotum*, *H. helinense*, *H. limatum*, *H. lomochmoum*, *H. monacroides*, *H. mutilescens*, *H. nanmocephaloides*, *H. nanmocephalum*, *H. odontolipes*, *H. paramecodes*, *H. paramorphum*, *H. sceletum*, *H. sordidiceps*, *H. tanycladum*, *H. tenellescens*, and *H. tenuiceps*.—A. Gundersen.

1565. PARKER, R. N. *Erythrina glabrescens* sp. nova. *Indian Forester* 46: 647-648. 1920.—A new tree reaching a height of 50-60 feet and a girth of 5-6 feet is described from India.—E. N. Munns.

1566. PFEIFFER, H. *Ficiniae speciebus novis aucta*. [New species of *Ficina*.] *Herbarium* 54: 33-34. 1920.—New species and varieties of *Ficina*, mostly from South Africa, are described as follows: *Ficina atrostachya*, *F. dasystachya* C. B. Clarke var. *Burchellii*, *F. Schlechteriana*, *F. thyrsoidea*, *F. canaliculata*, *F. decidua*, *F. Trinkleriana*.—H. A. Gleason.

1567. PIPER, C. V. A new genus of Leguminosae. *Jour. Washington [D. C.] Acad. Sci.* 10: 432-435. 1920.—*Monoplegma* is proposed as a new genus to which is referred one species, *M. sphaerospermum*, from Costa Rica. Superficially this plant resembles species of *Canavalia* but floral characters indicate that its relationship is much closer to *Dolichos*.—Helen M. Gilkey.

1568. PUGSLEY, H. W. Notes on the British hawkweeds. *Jour. Botany* 58: 281-285. 1920.—The notes were compiled in connection with an attempt to work out the British hawkweeds, *Hieracium*, of which during the past 25 years 250 gatherings have been made. A brief historical sketch of the study of this genus in Britain is given. Fourteen species are listed with accompanying notes on distribution, specific validity, and nomenclature. *Hieracium holophyllum* Linton β . *angustisquamum* is described as new.—K. M. Wiegand.

1569. RUSBY, H. H. Descriptions of three hundred new species of South American plants with an index to previously published South American species by the same author. 8 vo., 170 p. Published by the author: New York, December 20, 1920.—The following species of flowering plants, mostly from Colombia and Bolivia, are described as new to science: *Xanthosma bilineata*, *Tillandsia triangularis*, *T. attenuata*, *T. marantoidea*, *Dioscorea recurva*, *D. frutescens*, *D. truncata*, *D. Herbert-Smithii*, *D. hastatissima*, *Renealmia orinocensis*, *Myrica costata*, *Pouzolzia platyphylla*, *P. petiolata*, *Boehmeria sordida*, *Pilea macrophylla*, *Sahagunia colombiana*, *Myriocarpa magnifica*, *M. obscura*, *Roupala discolor*, *Struthanthus divaricatus*, *Aetanthus ovalis*, *Dendrophthora stricta*, *D. striata*, *Agonandra granatensis*, *Apodanthes tribracteata*, *Allionia craterimorpha*, *Berberis ovalifolia*, *B. densifolia*, *Cissampela tomentocarpa*, *Hyperbaena trinervis*, *Duguetia pauciflora*, *D. rostrata*, *Trigynaeia anastomosans*, *Oxandra ovata*, *Nectandra amplifolia*, *Ocotea flavescens*, *O. flexuosa*, *O. alloiophylla*, *Sparattanthelium Sprucei*, *Lepidium angustifolium*, *Radicula scabra*, *Morisonia elliptica*, *Elaeodendron macrophyllum*, *Brunellia boliviiana*, *B. Brittonii*, *Weinmannia lyrata*, *Licania venosa*, *Parinarium pachyphyllum*, *Moquilea cuspidata*, *M. orinocensis*, *Rourea laxiflora*, *Tournatea costata*, *Lotozalis phaseolifolia*, *L. manihotoides*, *Xanthoxalis unduavensis*, *X. flagellata*, *X. mollissima*, *X. biflexa*, *Ionoxalis pazensis*, *I. Buchtienii*, *Erythroxyton densum*, *E. uniflorum*, *Picramnia villosa*, *Protium mucronatum*, *P. orinocense*, *Cedrela boliviiana*, *Trichilia oblanceolata*, *Byrsonima Herbert-Smithii*, *Pterandra opulifolia*, *Heteropteris rhombifolius*, *Tetrapteris alloi-carpha*, *T. tenuistachys*, *Securidaca orinocensis*, *S. venosa*, *Monnina Buchtienii*, *Phyllanthus heteromorpha*, *Croton bondaensis*, *C. cienagensis*, *C. obtusus*, *C. ochromaeifolius*, *Acalypha*

salicioides, *A. amplifolia*, *A. Williamsii*, *A. subscandens*, *A. jubifera*, *A. asterifolia*, *Pera benensis*, *Chaetocarpus Pearcei*, *Sebastiania boliviana*, *Euphorbia sanmartensis*, *E. chiogenoides*, *E. subtrifoliata*, *Ilex imbricata*, *Salacea sphaerocarpa*, *S. mucronata*, *S. catalinensis*, *Hippocratea foliosa*, *Rhamnus atroviridis*, *Gaya rubricaulis*, *Malvastrum micranthum*, *Ayenia acuminata*, *Sterculia laxiflora*, *Saurauja brevipes*, *S. Herbert-Smithii*, *Clusia oblanceolata*, *C. ternstroemioides*, *Vismia falcata*, *V. angustifolia*, *Calceolaria hirsuta*, *C. curvirostra*, *Rinorea dichotoma*, *Hasseltia lateriflora*, *Casearia onacaensis*, *C. chlorophoroidea*, *C. Herbert-Smithii*, *Begonia unduavensis*, *B. lignosa*, *B. oblanceolata*, *B. heterodonta*, *B. subcostata*, *Grislea compacta*, *Ammania pedunculata*, *Combretum latipaniculatum*, *C. multidiscum*, *C. oblongifolium*, *Maïeta robusta*, *Hartmannia boliviana*, *Pentapanax granatensis*, *Hydrocotyle grossulariaefolia*, *Gaultheria sanmartensis*, *G. tetrishes*, *G. Fendleri*, *Macleania robusta*, *M. arcuata*, *M. recurva*, *Sophoclesia robusta*, *Vacciniopsis tetramera*, *Psammisia elegans*, *Cybianthus foliosus*, *Icacorea granatensis*, *I. Herbert-Smithii*, *I. sanmartensis*, *Symplocos mapiensis*, *Buddleia cochabambensis*, *Spigelia filipes*, *Aspidosperma elliptica*, *Tabernaemontana longiflora*, *T. albescens*, *T. cuspidata*, *T. myriantha* Britton, *Rauwolfia littoralis*, *Echites Sanctae-Martae*, *E. Laurentiae-disca*, *E. bicorniculata*, *Dipladenia alba-viridis*, *D. Buchtienii*, *D. piladenia*, *D. tetradenia*, *D. glabra*, *Odontadenia cuspidata* (*Dipladenia cuspidata* Rusby), *Mandevilla attenuata*, *Forsteronia foliosa*, *Prestonia mucronata*, *P. robusta*, *P. gracilis*, *Hemipogon andinum*, *H. Williamsii*, *Irmischia angustifolia*, *I. aristata*, *Philibertia filipes*, *P. ovalifolia*, *Stenomeria tomentosa*, *Metastelma atrovirens*, *M. pallidum*, *M. ovatum*, *Tassadia recurva*, *Ditassa Mandoni*, *Schistogyne pentaseta*, *Amphistelma leptocarpa*, *Vincetoxicum acutissimum*, *Marsdenia ecorpuscula*, *M. inelegans*, *M. asclepioidea*, *Phaeostemma grandifolia*, *Gonolobus Squiresii*, *G. attenuatus*, *G. leucodermis*, *Maripa acuminata*, *M. repens*, *Ipomoea hilarifolia*, *Cordia carnosa*, *C. opaca*, *C. subtruncata*, *Bourreia viridis*, *Tournefortia macrostachya*, *Coldenia aggregata*, *C. elongata*, *Aegiphila stricta*, *Lippia subterranea*, *Salvia tenuistachya*, *S. viridifolia*, *S. libanensis*, *S. multispicata*, *S. secundiflora*, *Solanum tetrapetalum*, *S. penduliflorum*, *S. scorpioideum*, *S. auctosepalum*, *S. sacupanense*, *S. deltoideum*, *Cyphomandra chlorantha*, *C. bassovioides*, *Bassovia calceolarioides*, *B. ferruginea*, *Physalis petiolaris*, *P. cuneata*, *P. margaranthoides*, *Cestrum imbricatum*, *C. papyraceum*, *Cuspidaria ovalis*, *Adenocalymna purpurascens*, *A. latifolia*, *A. symmetrica*, *Besleria debilis*, *B. tenuifolia*, *Gesneria onacaensis*, *Diastema Williamsii*, *Phinaea albiflora*, *Columnnea stricta*, *C. pallida*, *C. grandifolia*, *C. latifolia*, *C. sanmartensis*, *Beloperone sanmartensis*, *Jacobinea Lindaviana*, *Rondeletia colombiana*, *R. ovata*, *Elaeagia obovata*, *E. mollis*, *Lygistum tomentosum*, *Gonzalagunia acutifolia*, *Posoqueria platysiphonia*, *Randia orinocensis*, *Duroia Sprucei*, *Alibertia granulosa*, *Hoffmannia striata*, *H. viridis*, *Guettarda discolor*, *G. roupalaeifolia*, *Mapourea biacuminata*, *M. latifolia*, *Psychotria scabrifolia*, *P. albocostata*, *P. olyphylla*, *P. sanmartensis*, *P. indulgens*, *P. salicifolia*, *Palicourea populifolia*, *P. abbreviata*, *P. caloneura*, *P. Williamsii*, *Rudgea longirostris*, *Coussarea grandifolia*, *Borreria Herbert-Smithii*, *Siphocampylus rectiflorus*, *S. declinatus*, *Centropogon foliosum*, *Piptocarpha gracilis*, *Addisonia boliviana*, *Kanimia colombiana*, *Baccharis condensata*, *B. densifolia*, *Gnaphalium multicapitatum*, *Clibadium latifolium*, *C. lanceolatum*, *Baltimora ovata*, *Montanoa serrata*, *Wedelia heterophylla*, *W. symmetrica*, *Melanthera longipes*, *Encelia soratensis*, *E. deltoidea*, *Calea congesta*, *C. Herbert-Smithii*, *C. Holtoni*, *Pectis rosea*, *P. densa*, *Liabum biattenuatum*, *L. subumbellatum*, *L. stipulatum*, *L. falcatum*, *L. acuminatum*, *Moquinia macrocephala*, *Lycoseris oblongifolia*, *Onoseris alata*, and *Jungia grossulariaefolia*.—J. M. Greenman.

1570. SMALL, JOHN K. *Urechites pinetorum*. *Addisonia* 4: 21-22. Pl. 131 (colored). 1919.—The author gives a full description of this proposed new species of the family Apocynaceae, an inhabitant of the pine woods of the Everglade Keys of Florida, and includes notes on the related and long known species, *U. lutea* (L.) Britt., a vine, sometimes climbing to the top of tall trees, an inhabitant of the hammocks. The stem of the proposed species is erect.—T. J. Fitzpatrick.

1571. SMITH, CHARLES PIPER. Studies in the genus *Lupinus*—V. The *Sparsiflori*. *Bull. Torrey Bot. Club* 47: 487-509. Fig. 53-56. 1920.—Keys to, and diagnoses of, the following species and varieties of *Lupinus* are given: *L. hirsutissimus* Benth., *L. sparsiflorus* Benth.

and its varieties *arizonicus* (Wats.) comb. nov., *setosissimus* var. nov., *barbatulus* Thorner var. nov., *insignitus* var. nov., *vinopinatus* var. nov., *Pondii* (Greene) comb. nov.; *L. truncatus* Nutt. and its variety *Burlewii* var. nov.; *L. Benthami* Heller and its variety *opimus* var. nov.; *L. citrinus* Kellogg; and *L. deflexus* Congdon.—P. A. Munz.

1572. STANDLEY, PAUL C. The North American species of *Agonandra*. Jour. Washington [D. C.] Acad. Sci. 10: 505-508. 1920.—Two new species, *A. obtusifolia* and *A. Conzattii*, are described and *A. racemosa* (*Schaefferia racemosa* DC.) appears as a new combination, all from Mexico. This is the first time that the genus has been reported from North America, and this is the only genus of the family Opiliaceae known on the western continent.—Helen M. Gilkey.

MISCELLANEOUS, UNCLASSIFIED PUBLICATIONS

B. E. LIVINGSTON, *Editor*

S. F. TRELEASE, *Assistant Editor*

1573. ANONYMOUS. Artificial wool from cotton waste. Sci. Amer. 123: 569. 1920.

1574. DOFLEIN, FRANZ. Das Problem des Todes und der Unsterblichkeit bei den Pflanzen und Tieren. [Death and immortality in plants and animals.] 119 p. G. Fischer: Jena, 1919.

1575. FONTANEL, P. Séchage des plantes pour herbiers. [The drying of plants for herbaria.] Nat. Canadien 47: 51-61. 1920.—The author notes the common and the complicated processes of drying plants and proposes an intermediate process depending first on drying under the usual pressure of absorbent layers but at a higher temperature, to accelerate the evaporation of moisture and forestall the degenerative action of enzymes and bacteria. This requires a current of heated air, the temperature being first between 60 and 70°C. Later the temperature should be considerably lowered. A box holds the plants over a suitable source of heat. Between the specimen sheets are sheets of tubed cardboard through which the upward current of warm air passes. Methods for treating certain plants with chemicals, to preserve color, elasticity, etc., and to prevent decomposition, are also considered.—A. H. MacKay.

1576. JORDAN, W. H. Director's report for 1919. New York Agric. Exp. Sta. [Geneva] Bull. 470. 28 p. 1919.—A discussion of administrative matters and of the research work of the station in 1919. A list of the publications issued by the station during 1918 and 1919 is appended.—F. C. Stewart.

1577. MOUNT, H. A. Our coal in the making. Sci. Amer. 123: 522, 532, 534-535. 4 fig. 1920.—A popular article on peat.—Chas. H. Otis.

1578. NEWTON, R. The quality of silage produced in barrels. Jour. Amer. Soc. Agron. 13: 1-11. 1921.—Judging by the odor, appearance, palatability, and chemical tests, barrels were found to be suitable experimental containers for silage. Silage from barrels was found to compare favorably with silage from farm silos.—F. M. Schertz.

1579. PATHAK, G. P. Some famine foods in Ahmedabad. Agric. Jour. India 15: 40-45. 1920.—New materials which have been utilized as famine food are Bid (rhizomes of *Scirpus kysoor*), Thek (rhizomes of *Cyperus bulbosus*), Poli of pan (the inflorescence of *Typha angustata*), and tubers and fruits of poyana (*Nymphaea stillata*). Bid contains about 70 per cent of digestible carbohydrates and 8-10 per cent of proteids. When used for human food the clods dug from the soil containing the rhizomes are left unbroken until thoroughly dried. The thek plant grows naturally in salt land; when properly dried and roasted it is used for flour. Poyana is the common water lily of the nal. The tubers are roasted in ashes or are

boiled. The seeds are used for flour. The dried tubers contain about 68 per cent of digestible carbohydrates and 15 per cent of proteids; the seed, 70 per cent of carbohydrates and 11 per cent of proteids.—*J. J. Skinner*.

1580. SCHNEGG, H. *Die Pilze und ihre volkwirtschaftliche Bedeutung*. [Fungi and their domestic significance.] Ber. Senckenberg. Naturf. Ges. Frankfurt a. M. 49: 90-91. 1919.—A synopsis of a lecture on the utilization of mushrooms is here given. Their importance as food for man and domestic animals is emphasized, and their employment in powdered form is especially recommended. It is further suggested that woody shelf-fungi be used as a substitute for cork and kindling wood.—*A. W. Evans*.

1581. SCHÜRHOFF, H. *Die Verwertung der Brennesseln als Gespinnstfasern*. [The utilization of nettle-fibers in spinning.] Ber. Senckenberg. Naturf. Ges. Frankfurt a. M. 49: 73. 1919.—In this report of a lecture on nettle-fibers, the utilization on a commercial basis is described, and the hope is expressed that these fibers may partially take the place of cotton in Germany.—*A. W. Evans*.

1582. VON STIETZ, G. E. C. *Molasses as fuel, and the manufacture of potash from the ashes*. Louisiana Planter and Sugar Manufacturer 64: 348-350. 1920.—Molasses can be burned in combination with other fuels. The ashes have a very high content of potassium salts. Methods of extracting and refining the ashes are given.—*C. W. Edgerton*.

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AGRONOMY

C. V. PIPER, *Editor*

MARY R. BURR, *Assistant Editor*

(See also in this issue Entries 1888, 1899, 1920, 1923, 1925, 1963, 1971, 1973, 2013, 2097, 2104, 2106, 2127, 2161, 2170, 2178, 2190, 2217, 2219, 2220, 2221)

1583. ANONYMOUS. Springside crop-growing competition. Agric. Gaz. New South Wales 32: 86-87. 1921.—Results are given by 6 farmers in crop growing for prizes. Varieties, methods of cultivation, amounts of seed and manure, and other data are tabulated.—*L. R. Waldron.*

1584. ANONYMOUS. The trend of research work in the agricultural utilization of peat land. Jour. Amer. Peat Soc. 14: 64-66. 1921.—Most of the undrained peat land in the United States is strongly acidic. Raw peat soils are suited to the culture of millet, buckwheat, redtop, oats, corn, rye, potato, the blueberry, and the cranberry. When treated with potash salts and lime they are neutralized and should yield good crops of red clover, wheat, and rutabagas. The successful cultivation of peat lands is dependent on the recognition of differences of acidity and alkalinity and the appropriate adaptation of crops.—*G. B. Rigg.*

1585. ANONYMOUS. Verslagen der Rijkslandbouw proefstations voor Contrôle-Onderzoek. [Reports of the Government Agricultural Control Stations.] Verslag. en Mededeel. Directie Landb. [Nederland] 1919⁴: 1-103. 1919.—A report is given of the activities of the Control Agricultural Stations at Wageningen, Goes, and Maastricht on examinations of fertilizers, seed samples, etc.—*J. C. Th. Uphof.*

1586. ANONYMOUS. Verslagen der Rijkslandbouw proefstations voor Contrôle-Onderzoek. [Reports of the Government Agricultural Control Stations.] Verslag. en Mededeel. Directie Landb. [Nederland] 1920⁴: 1-80. 1920.—A report of the activities of the Control Agricultural Stations at Wageningen, Goes, and Maastricht on examinations of fertilizers, seed samples, etc.—*J. C. Th. Uphof.*

1587. ANONYMOUS. [Rev. of: BRENCHEY, W. E. Weeds of farm land. $x + 329$ p. *Illus.* Longmans, Green & Co.: London, 1920.] Sci. Prog. [London] 15: 500-501. 1921.

1588. ANONYMOUS. Habit in sugar canes. [Rev. of: RAO, N. VITTAL. Habit in sugar canes. Agric. Jour. India 15: 418-424. 1920. (Paper read at the 7th Indian Science Congress, Nagpur, 1920.) (See Bot. Absts. 7, Entry 1569).] Internat. Sugar Jour. 23: 109. 1921.

1589. ANNETT, HAROLD EDWARD. Factors influencing alkaloidal content and yield of latex in the opium poppy (*Papaver somniferum*). *Biochem. Jour.* 14: 618-636. 1920.—The following points are discussed by the writer: (a) Alkaloidal content and yield of latex from each of a series of successive lancements of the same capsule; (b) variation in rate of flow and morphine content of latex at different periods of time after incision; (c) effects of different systems of lancing on yield and composition of latex; (d) yield and alkaloidal content of latex from different capsules on the same plant; (e) relation between stage of development of capsule and yield, and alkaloidal content of latex; (f) effects of climate and weather conditions; (g) influence of manures; (h) influence of starvation; and (i) influence of heredity.—A. R. Davis.

1590. B[ARBER], C. A. On the viability of sugar cane pollen. *Internat. Sugar. Jour.* 23: 71-72. 1921.—T. S. VENKATARAMAN of the Coimbatore Cane-breeding Station in south India reports success in germinating sugar cane pollen. The stigmas of *Datura fastuosa* var. *alba* and *Hibiscus vitifolia* germinated cane pollen satisfactorily. Working with this test it was found that cane pollen usually lost its viability in less than an hour, varying slightly with the variety of cane. By protecting a cane plant with its arrows, the pollen sacs were prevented from bursting. In this way pollen was kept viable for 6-14 days.—C. Rumbold.

1591. BESEMFELDER, R. Der Zuckerrübenbau der Zukunft. [The sugar beet culture of the future.] *Mitteil. Deutsch. Landw. Ges.* 35: 401-406. 1920.—A general review of the factors affecting the growth of the sugar beet industry.—A. J. Pieters.

1592. BOUSSET, HERMANN. Das Schilfrohr als Wirtschaftspflanze und das Siedlungsproblem. [Phragmites as an economic plant and the settlement problem.] *Mitteil. Deutsch. Landw. Ges.* 35: 411-413. 1920.—There are 200,000 hectares of low land on sea and river in Germany covered with *Phragmites*. The growth tends to encroach on the water and obstruct navigation. To combat this, machines have been constructed with clam shell buckets to dredge out the mass of rootstocks. It is said that the rootstocks contain 52 per cent extractives, of which 30 per cent is sugar. The rootstocks have been used to prepare alcohol, 100 kg. of air dry material yielding 11 liters of 100 per cent alcohol. A heavy beer, resembling porter, has also been brewed, and from some parts of the rootstocks a cocoa-like drink called "Branca" can be made. A feed for cattle called "Fragruit" is also produced and is said to have a high feeding and digestive value.—A. J. Pieters.

1593. DAWE, M. T. Colombian pita fibre.—Part I. *Tropic. Life* 16: 182-183. 1920.—The Pita plant, *Ananas* sp. is found in Colombia and adjacent South and Central American republics. It has been known as *Ananas macrodontes* but a recent examination of material at the Kew Gardens "proves the Colombian plant to be quite distinct from this species." A single plant 10 feet or more in length and 4 inches broad in the middle bears from 20 to 40 leaves, and produces a pineapple-like fruit. Propagation is usually by rootstocks; the plant makes its best growth in the shade. The Chiriguana forest of Colombia is famed for its "pitales." It does best on a light sandy, well-drained soil. The fiber of the Pita plant is long and strong and would be classed commercially as a hard fiber, and could be used as a substitute for sisal, abaca (Manila hemp), and other hard fibers.—H. N. Vinall.

1594. EGGINTON, G. E., AND W. W. ROBBINS. Irrigation water as a factor in the dissemination of weed seed. *Colorado Agric. Exp. Sta. Bull.* 253. 25 p. 1920.—Weed traps of wire netting were placed in irrigation ditches and at the end of varying periods their contents were removed, dried, and examined. In 156 traps from 3 different ditches 81 species of weed seeds were found. The factors influencing the number of seeds carried are enumerated and explained: (1) Flora of ditch bank and adjacent territory; (2) season of year; (3) direction and velocity of wind; (4) velocity of water and character of water surface. Continued grazing is recommended as the most effective and most economical method in reducing weed growth. The seeding of ditch banks to brome grass is also suggested.—Elsa B. Eisendrath.

1595. FLYNN, H. C. K. Statistics of crops grown by Europeans in southern Rhodesia for the season 1919-1920. Rhodesia Agric. Jour. 18: 9-16. 1921.—General crop statistics for 1919-1920, compiled from reports sent in by farmers for that period. Figures are given for maize, wheat, ground nuts, beans, kafir corn, sunflowers, buckwheat, cattle melons, pumpkins, rice, Rapola, potatoes, teff grass, oat hay, Napier grass, millet, veld hay, tobacco, and citrus orchards.—*Mary R. Burr.*

1596. FRAPS, G. S. Feeding values of certain feeding stuffs. Texas Agric. Exp. Sta. Bull. 245. 29 p. 1919.—Digestible matter and productive value of foods may be very different. Tests were made with cottonseed meal and cottonseed hulls, showing that the former has almost twice the digestible material but about four times the productive value of the latter. Compositions and feeding values are given for acorns, alfalfa hay, bear grass, beet pulp, corn cobs, cotton burs, cottonseed, peanut meal, prairie hay, rice bran, rice hulls, Rhodes grass hay, soapweed, and Spanish moss.—*L. Pace.*

1597. FRAPS, G. S., AND S. LOMANITZ. The salt or sodium chloride content of feeds. Texas Agric. Exp. Sta. Bull. 271. 14 p. 1920.—A rapid method of estimating chlorides is described, and the chloride content of a number of feeds is given. Eastern alfalfa is lower in chlorides than western. The question as to whether the chlorides in alfalfa are useful, and whether an addition of salt to some alfalfa soils would be beneficial cannot yet be answered.—*L. Pace.*

1598. HARRIS, F. S. The agronomist's part in the world's food supply. Science 52: 395-400. 1920.—The author, looking into the future, finds the problem of feeding an ever-increasing population a more and more difficult one. An increased production will be called for, which can be realized in 2 ways: 1st, by extending the producing area; 2nd, by increasing the acre yield of the present cultivated area. The methods for enlarging the agricultural area are discussed under the following headings: Increasing the irrigated area; extending dry farming; draining the wet lands; and reclaiming the alkali lands.—*A. H. Chivers.*

1599. HOEK, P. VAN. Verslag over den Landbouw in Nederland. [Report on Agriculture in the Netherlands.] Verslag. en Mededeel. Directie Landb. 1920^o: 1-116. 1920.—Reports are given on production and condition of farm crops, vegetables, fruits, seeds, bulbs; other agricultural and horticultural activities in the Netherlands are likewise considered.—*J. C. Th. Uphof.*

1600. HOFFMAN. Kartoffeldüngungsversuche mit Kalisulfaten im Erntejahr 1920. [Potato fertilizing experiments with potassium sulphate in the season 1920.] Mitteil. Deutsch. Landw. Ges. 36: 116. 1921.—Potassium sulphate was compared with a potassium-magnesium sulphate; no additional advantage resulted from the use of the latter.—*A. J. Pieters.*

1601. LEIPZIGER. Bericht über einige Gras- und Kleebau-betriebe Norddeutschlands. [Report on some grass and clover seed operations of north Germany.] Mitteil. Deutsch. Landw. Ges. 36: 134-135. 1921.—An account of a visit to several farms where grass and clover seeds are grown as special crops. Selection of color for winter hardiness was being carried on near Niendorf.—*A. J. Pieters.*

1602. LEPPAN, H. D. The production of foodstuffs for live stock in South Africa. South African Jour. Indust. 3: 1116-1130. 1920.—Agronomic production is related to rainfall, soils, altitudes, and latitude, and the author discusses these factors for South Africa. The acre yields of most crops are low, the average for maize being 7-10 bushels; the causes of the low yields are said to be generally careless methods of farming and attempts to grow unsuitable crops. Feed stuffs to supplement grazing are greatly needed and the making of silage is urged. The author lists and discusses the chief summer and winter forage crops, noting that "the cultivated grasses of promise in South Africa to-day are all indigenous to Africa, chiefly tropical Africa." The most important summer forage crops are maize, lucerne, Teff grass (*Eragrostis Abyssinica*), millets (*Chaetocloa*, *Echinochloa*, *Pennisetum*), cowpeas, soybeans,

and sorghums. Besides Teff grass, Sudan, Kikuyu (*Pennisetum longistylum*), Toowoomba grass (*Phalaris bulbosa*), and Napier or Elephant grass (*Pennisetum purpureum*) do quite well. Among the most important of what may be called the minor agricultural grasses in South Africa are *Paspalum dilatatum* (Water grass), *Paspalum virgatum* (Erect Paspalum), *Festuca arundinacea* (New Zealand tall Fescue), *Festuca ovina* (Italian Fescue), *Dactylis glomerata* (Cocksfoot), *Lolium multiflorum* (Italian rye grass), and *Chloris gayana* (Rhodes grass). Blaauwzaad grass (*Chloris virgata*) has done well in parts of the Orange Free State and in the Transvaal. Root crops are grown under irrigation, and Kaffir melons, pumpkins, ground nuts, artichokes, sunflowers, and velvet beans are grown to some extent. Tepary beans, Kudzu, and Mung beans have recently been introduced and seem worthy of attention. The chief winter crops are the grains, rape, vetches, and peas.—A. J. Pieters.

1603. McDONALD, A. H. E. Cutting Sudan grass for seed. Agric. Gaz. New South Wales 32: 85. 1921.—In New South Wales best results are secured when the 2nd or 3rd growths are cut for seed. Binders are used for harvesting.—L. R. Waldron.

1604. MAIDEN, J. H. Chats about the prickly pear. No. 9. Agric. Gaz. New South Wales 32: 97-104. 4 fig. 1921.—The author discusses *Opuntia aurantiaca*, *O. elatior*, *O. inermis*, *O. tomentosa*, *O. ficus-indica*, *O. robusta*, *O. monacantha*, *O. Dillenii*, and *O. cochiniifera* as noxious weeds. Distribution, taxonomy, and morphological characters of the species are considered.—L. R. Waldron.

1605. MUNDY, H. G. Kudzu vine. (*Pueraria thunbergiana*). Rhodesia Agric. Jour. 18: 83-88. Fig. 1-2. 1921.—Kudzu, an extremely promising legume, has been grown at the Salisbury experiment station since 1918. It makes an early spring growth, and gives a heavy yield of nutritious fodder, apparently palatable either green or dry for all classes of stock. Kudzu produces root nodules freely and leaves a large amount of decaying vegetable matter on the land; consequently, it should be valuable as a soil renovator.—Mary R. Burr.

1606. MUNDY, H. G. Wheat in Rhodesia. Rhodesia Agric. Jour. 17: 501-512. 6 fig. 1920.—The present annual consumption of wheat in southern Rhodesia is some 31,000 bags in excess of production. The paper discusses cultural methods for wheat growing, varieties, harvesting and threshing, and diseases and pests. Summer wheat cannot be grown because of rust; winter wheat may sometimes suffer from rust, but not seriously. Some work has been done in selection of resistant varieties but so far with no permanent success. Smut is prevalent and seed treatment is urged. Deaf ear or white ear is caused by frost at blossoming time. This can be prevented by seeding at such a time that the plant does not bloom until after frost or by grazing to retard the maturity of the plant.—A. J. Pieters.

1607. NOLTE, O. Düngungsversuche mit magnesiahaltigen und magnesiafreien Kalisalzen. [Fertilizer experiments with magnesia-free and magnesia-containing potash salts.] Mitteil. Deutsch. Landw. Ges. 36: 136. 1921.—Both potassium-magnesium sulphate and potassium chloride failed to increase the yield of potatoes in this experiment, although on the same field, but in another experiment, potassium sulphate produced a large increase in yield.—A. J. Pieters.

1608. Παπαγεωργίου Πηλ. Συμβολή Εἰς Τὴν Ἑλληνικὴν Σιτηρογραφίαν. [PAPAGEORGIOU, PELEUS. Contribution to Greek cereology. Part 1, wheat.] 139 p. Athens, 1919.—A short treatise, or monograph, dealing with the cultivated kinds of wheat in all of the different parts of Greece, with a brief introduction on selection, breeding, the cereology of ancient Greece, and the importance of wheat cultivated in modern Greece. The native varieties especially adapted to the climatic conditions of Greece are examined and information as to yield, time of sowing, soil and rainfall requirements are fully discussed. The species of wheat, *Triticum polonicum*, *T. durum*, *T. turgidum*, *T. sativum*, *T. spelta*, *T. amyleum*, and *T. monococcum* are discussed and illustrated. A table of the main species of wheat with their most important varieties is included. A bibliography is also given.—Geo. Bouyoucos.

1609. PRIDHAM, J. T. The origin and history of Sunrise oats. *Agric. Gaz. New South Wales* 32: 88-90. 2 fig. 1921.—The variation was noticed in 1910 and probably arose from field cross between wild oats (*A. fatua*) and Algerian oats (*A. sterilis*). The variety is early and the seed creamy white. Two variations of Sunrise have been named Cowra No. 25 and Cowra No. 27.—*L. R. Waldron*.

1610. PRIDHAM, J. T. Ortlipp's Bungowannah wheat. *Agric. Gaz. New South Wales* 32: 85. 1921.—This variety is the same as Turvey or Turvey's Purple Straw and belongs to the Tuscan group of wheats.—*L. R. Waldron*.

1611. REINECKE, T. G. W. Results of winter cereal experiments at the School of Agriculture, Elsenburg, Mulder's Vlei, Cape Province. *Jour. Dept. Agric. Union of South Africa* 1: 45-54. 1920.—Considering both palatability of hay and yield per acre, combination of the various varieties of oats and vetches have been found the best for hay. For ensilage a mixture of Smyrna oats and spring or French winter vetch can be recommended in addition to hairy vetch and Algerian oats. Rye, barley, wheat, and field peas have not been found desirable crops for hay mixtures.—*E. M. Doidge*.

1612. RINDL, M. Sesame and melon seeds sources of semi-drying oils. *South African Jour. Indust.* 3: 1150-1154. 1920.—The author treats of the production and consumption of the seeds of sesame, its varieties, utilization, cultivation, harvesting, pressing, production in Africa, and prices. The fat content of both fresh and dried melon seeds is given.—*Mary R. Burr*.

1613. SCHERFFIUS, W. H. Cotton culture. Practical advice for the South African grower. *Jour. Dept. Agric. Union of South Africa* 2: 160-162. 1921.—General cultural notes emphasizing the importance of using pure seed and having quality as the principal aim in cotton production.—*Mary R. Burr*.

1614. SCHMID, A. Bericht der Zentralverwaltung der schweizerischen landwirtschaftlichen Versuchs- und Untersuchungsanstalten über die Versuchstätigkeit in den Jahren 1913-1919. [Report of experimental work performed during 1913-1919.] *Landw. Jahrb. Schweiz* 1919: 513-518. 1919.—A brief résumé of field experiments conducted by the Swiss government, including observations on cultural tests with grains, beets, and potatoes; studies of the behavior of various mixtures of grass seeds and of pasture fertilizing; and experiments on the control of diseases and other pests of cultivated plants.—*J. D. Luckett*.

1615. STAFFELD, U. Aussaatstärke unter Berücksichtigung des Tausendkorngewichts. [Rate of seeding in relation to the weight of 1000 grains.] *Mitteil. Deutsch. Landw. Ges.* 35: 408-411. 1920.—A discussion of the relations between the weights of 1000 grains of oats, winter rye, summer and winter wheat, the rate of seeding, and probable yields.—*A. J. Pieters*.

1616. TAYLOR, H. W. Cotton culture. *Rhodesia Agric. Jour.* 17: 436-440. 1920.—Author gives the figures for world cotton production for a period of 20 years (1894-1914). During this period the production of cotton in the United States increased 53.2 per cent and the price per pound 90.4 per cent. America supplies 85 per cent of the cotton used in Great Britain. In southern Rhodesia soil and climatic conditions are favorable for cotton production. General cultural notes are given; also figures showing the value of the crop. The developments of new cotton areas and the stimulation of the industry in Great Britain is urged.—*Mary R. Burr*.

1617. TAYLOR, H. W. Turkish tobacco. *Rhodesia Agric. Jour.* 17: 513-521. Fig. 1-7. 1920.—Turkish tobacco is grown in Rhodesia by a number of planters with varying degrees of success. The crop is easy to grow, but the harvesting and handling require considerable skill which can be acquired only by actual experience. The article gives detailed directions for culture, harvesting, curing, grading, and packing.—*C. V. Piper*.

1618. VOLKART, A., A. GRISCH, UND W. BANDI. Vierziester und einundvierziester

[Fortieth and forty-first annual reports of the Swiss seed testing station at Oerlikon-Zurich.] Landw. Jahrb. Schweiz 1919: 38-77. 1919.—The reports include: (1) A report of the seed testing station for the years 1916-17 and 1917-18, with a summarized statement of the results of seed tests from 1876 to 1918; (2) a brief review of cultural tests with field crops conducted by the station 1917-18; and (3) a report of work on the control of plant diseases and of weeds during 1917 and 1918.—J. D. Luckett.

1619. VOSZ, G. Vergleichende Versuche zur Bekämpfung von Hederich und Ackersenf mit chemischen Mitteln. [Comparative tests of chemicals for the control of hedge-mustard and charlock.] Fühling's Landw. Zeitg. 69: 226-234. 1920.—Results of experiments with kainit, $\text{Ca}(\text{NO}_3)_2$, a mixture of kainit and $\text{Ca}(\text{NO}_3)_2$ in half the full amounts, FeSO_4 and $(\text{NH}_4)_2\text{SO}_4$ for killing hedge-mustard (*Raphanus raphanistrum*) and charlock (*Sinapis arvensis*) in fields of oats. The first 3 materials were dusted on the plants in powdered form early in the morning while the plants were heavily covered with dew, at the following rates per hectare: Kainit, 1000 kgr.; $\text{Ca}(\text{NO}_3)_2$, 140 kgr.; mixture of 500 kgr. kainit and 70 kgr. $\text{Ca}(\text{NO}_3)_2$. The FeSO_4 and $(\text{NH}_4)_2\text{SO}_4$ were applied at the rate of 150 kgr. per hectare in 25 per cent solutions sprayed on the plants just before noon.—The most satisfactory results in all cases were secured with $(\text{NH}_4)_2\text{SO}_4$ solution. In addition to killing the mustard, the solution showed a marked fertilizer effect in increasing the yields of oats. The other materials also gave satisfactory results except that in one case FeSO_4 solution partly damaged the oats, causing a somewhat reduced yield. Next to $(\text{NH}_4)_2\text{SO}_4$, $\text{Ca}(\text{NO}_3)_2$ produced the greatest increases in yield of oats. To get satisfactory results with the powdered chemicals there should be a heavy dew, which should not evaporate too quickly.—A. T. Wiancko.

1620. WALSTER, H. L. Which variety for North Dakota? [Part of: "Practical pointers on North Dakota farming."] North Dakota Agric. Exp. Sta. Ext. Div. Circ. 40. 3-8. 1920.—The author recommends varieties of spring wheat, oats, barley, corn, flax, potatoes, sunflowers for silage, hay and pasture crops best adapted to North Dakota conditions.—L. R. Waldron.

1621. WALTERS, J. A. T. Fibre crops. Deccan hemp (*Hibiscus cannabinus*) and Sunn hemp (*Crotalaria juncea*). Rhodesia Agric. Jour. 17: 522-528. Fig. 1-4. 1920.—Experimentation has demonstrated the fact that both Deccan hemp and Sunn hemp seem to thrive on the common red and granite soils of Rhodesia under conditions suitable for maize. Both plants are sources of valuable commercial fiber. The adaptability of the 2 crops to Rhodesian conditions makes them highly desirable as constituents in a system of rotation with maize or tobacco.—Mary R. Burr.

1622. WHITTET, J. N. Farmers' experiment plots. Grasses and clovers for the North coast. Agric. Gaz. New South Wales 32: 135. 1921.—Rhodes grass (*Chloris gayana*), elephant grass (*Pennisetum purpureum*), canary grass (*Phalaris bulbosa*), Chilean clover (*Trifolium pratense perenne*), and Bokhara clover (*Melilotus alba*) were planted on a private farm for comparative trial. No results are given.—L. R. Waldron.

1623. WHITTET, J. N. The production of lucerne seed. With some reference to lucerne culture in our drier districts. Agric. Gaz. New South Wales 32: 105-112. 16 fig. 1921.—Alfalfa trials are under way at Bathurst and Cowra experiment farms and include varieties and geographic strains as follows: Tamworth Broad Leaf, China, Cossack, Semipalatinsk, Montana, Kansas, Bathurst Nos. 6 and 9, and Grimm. The author discusses pollination and the need for testing for purity and vitality. Results of purity test are given; also information for seeding, harvesting, and threshing the crop.—L. R. Waldron.

1624. WILLIAMS, C. O. Composition and valuation of fertilizers and feeding stuffs. Jour. Dept. Agric. Union of South Africa 1: 368-382. 1920.—This is a critical account of the various fertilizers and feeding stuffs at present on the South African market.—E. M. Doidge.

1625. WINTERS, R. Y., AND V. R. HERMAN. Soybeans for the Piedmont and mountain sections of North Carolina. North Carolina Agric. Ext. Service Ext. Circ. 111. 15 p. 1921.—An agronomic study of the comparative value of soybeans and cowpeas for seed and hay.—

BIBLIOGRAPHY, BIOGRAPHY AND HISTORY

NEIL E. STEVENS, *Editor*

(See also in this issue Entries 1608, 1819, 1822, 1837, 1858, 1863, 2020, 2066, 2101)

1626. ANONYMOUS. A journal of ecology. *Science* 51: 161. 1920.—The Plant World has been transferred to the Ecological Society of America, and will be continued as the official organ of that society, under the title of *Ecology*.—*Neil E. Stevens*.

1627. ANONYMOUS. An unsere Leser. [To our readers.] *Wiener Allg. Forst- u. Jagd-Zeitg.* 38: 174. 1920.—Announcement under date of July 2, 1920, of the addition of the word "Wiener" (Vienna) to the title of the journal in order to distinguish it from the German periodical of the same name (*Allgemeine Forst- und Jagd-Zeitung*), under which it was issued from March 5 to June 25, 1920 (v. 38, no. 10-26), having been previously published under the title: *Oesterreichische Forst- und Jagd-Zeitung*.—*F. S. Baker*.

1628. ANONYMOUS. The botanical survey of the Union of South Africa. *Jour. Dept. Agric. South Africa* 1: 180-182. 1920.—See *Bot. Absts.* 8, Entry 1629.

1629. ANONYMOUS. Botanical survey of the Union of South Africa. *Roy. Bot. Gard. Kew Bull. Misc. Inform.* 1919: 399-403. 1919.—The Advisory Committee was announced Oct. 5, 1918, with Dr. I. B. POLE-EVANS as head and acting director of the survey. Miss A. G. CORBISHLEY was appointed Oct. 15, 1919, as botanical assistant at Kew on work connected with the survey. The scope of the survey is outlined.—*M. F. Warner*.

1630. ANONYMOUS. Edward John Woodhouse. *Roy. Bot. Gard. Kew Bull. Misc. Inform.* 1918: 32. 1918.—Lieut. E. J. Woodhouse, Economic Botanist and Principal of the Agricultural College of Bihar and Orissa, died in France December 18, 1917, at the age of 33.—*M. F. Warner*.

1631. ANONYMOUS. John Gilbert Baker. *Gard. Chron.* III, 68: 102. 1920.—Brief sketch of the life and work of J. G. Baker (1834-1920).—*M. F. Warner*.

1632. ANONYMOUS. Major S. M. Toppin's bequest to the Royal botanic gardens. *Roy. Bot. Gard. Kew Bull. Misc. Inform.* 1918: 156-157. 1918.—Important collections made on northwestern frontier of India and in northern Burma, by Sidney Miles Toppin, born June 12, 1878, and killed near Ypres, Sept. 24, 1917.—*Neil E. Stevens*.

1633. ANONYMOUS. Maurice L. de Vilmorin. *Roy. Bot. Gard. Kew Bull. Misc. Inform.* 1918: 190. 1918.—Obituary of M. L. de Vilmorin (1849-1918), senior member of the firm of Vilmorin-Andrieux & Cie., who was specially interested in the introduction of Chinese plants, and who had at his estate at Les Barres a collection of shrubs which was probably the most comprehensive in Europe.—*M. F. Warner*.

1634. ANONYMOUS. Polozheniye opytnogo otdela v sisteme organov Komissariata Zemle-deliya. [The status of the experimental division in the system of organization of the commissariat of agriculture.] *Vestnik Narodnogo Kom. Zeml.* 1: 55-59. 1919.—An independent division of the Russian Commissariat of Agriculture, designated as the Experimental Division, has been created in the system of the present government of Russia, with the task of uniting, promoting, and directing agricultural experimental work. A higher degree of efficiency and greater coordination of activities in agricultural research is expected through this consolidation. The new office covers climatological, geobotanical, and soil investigations; administrative and financial direction of experiment stations, botanical gardens, and like institutions; meteorology; horticulture; fiber plants; tea; tobacco; oil plants; mineral fertilizers; breeding and selection; agricultural engineering; entomology and phytopathology. The Experimental Division undertakes also to prepare specialists in various lines of agricultural experimentation and to popularize the results of scientific achievements. The Division expects to work in consultation with an advisory board of representatives of various

1635. ANONYMOUS. Presentation of the Capt. Scott memorial medal to Dr. I. B. Pole Evans, on May 15th, 1919. *South African Jour. Nat. Hist.* 2: 12-18. *Pl.* 1. 1920.—A note on the scientific training and work of Illyd Buller Pole Evans, with special reference to his services in organizing phytopathological work in the Transvaal, and a list of his publications.—*M. F. Warner.*

1636. ANONYMOUS. Reginald J. Farrer. *Nature* 106: 413-414. 1920.—Life and work of Reginald John Farrer (1880-1920), collector and cultivator of alpine plants, as well as author of books of fiction and on rock gardens. He received the Gill memorial medal of the Royal Geographical Society in 1920 for work on the Chinese border of Tibet.—*O. A. Stevens.*

1637. ANONYMOUS. R. H. Pearson. *Roy. Bot. Gard. Kew Bull. Misc. Inform.* 1918: 213. 1918.—Obituary notice of Robert Hooper Pearson (1866-1918), connected since 1892 with the *Gardeners' Chronicle*, and for the past 10 years its managing editor.—*M. F. Warner.*

1638. ANONYMOUS. Samuel Mills Tracy. *Science* 52: 270. 1920.—Died at Laurel, Mississippi, September 5th, 1920, aged 73 years.—*M. F. Warner.*

1639. ANONYMOUS. [Sir Edmund Loder.] *Bull. Soc. Nat. Acclim. France* 67: 97-99. 1920.—Obituary notice. Loder was better known as a zoologist, though he was also noted for his special knowledge of rhododendrons and conifers, publishing in 1913 a list of his magnificent collection of conifers at Leonardslee.—*M. F. Warner.*

1640. ANONYMOUS. T. A. Dorrien-Smith. *Roy. Bot. Gard. Kew Bull. Misc. Inform.* 1918: 242-243. 1918.—Obituary of Thomas Algernon Dorrien-Smith, who died on August 6th, 1918, in his 73d year. His gardens at Tresco Abbey in the Scilly Islands were especially remarkable for the New Zealand and Australian plants which flourished there. He was the pioneer in the culture of Narcissus on an extensive scale for the English markets, an industry begun about 35 years ago in a time of distress among the Scilly farmers.—*M. F. Warner.*

1641. ÅKERMAN, ÅKE. F. Kølpin Ravn, 10 maj 1873-25 maj 1920. *Sveriges Utsadesför. Tidskr.* 30: 122-124. 1920. [See also *Bot. Absts.* 8, Entries 1681, 1708, 1804.]

1642. ALKER, F. R. Botanical gleanings from the writings of early travellers in western Pennsylvania. *Trillia* 5: 8-22. 1919.—J. D. Schoepf, Thomas Hutchins, William Darby, F. Cumming, and Joseph Doddridge.—*Neil E. Stevens.*

1643. A[RBER], A[GNES]. Edward Alexander Newell Arber (1870-1918). *Jour. Botany* 56: 305-308. *Portrait* (facing p. 337). 1918.—E. A. Newell Arber, one of the leading students of systematic paleobotany, was also an authority on plant life in the Alps. The present sketch includes notes on his education and personal characteristics. [See also *Bot. Absts.* 8, Entry 1772.]—*Neil E. Stevens.*

1644. ARDOUIN-DUMAZET. Les pêchers de Montreuil I-II. [Peach culture at Montreuil.] *Jour. Agric. Pratique N.S.*, 33: 126-128, 165-167. 1920.—The first part gives the beginnings of the peach culture which has given to this region the name of Montreuil-aux-Pêches. The first planting is said to have been done by Girardot, a former musqueteer, in the reign of Louis XIV.—*M. F. Warner.*

1645. BAILEY, L. H. R U S; a register of the rural leadership in the United States and Canada. 2nd ed., 533 p. Ithaca, New York, 1920.—Directory of botanical and agricultural workers with brief biographical data. First edition was published Nov., 1918.—*Neil E. Stevens.*

1646. B[AKER], J. G. Matthew B. Slater. *Jour. Botany* 56: 191. 1918.—Mr. Slater (1830-1918) communicated a number of localities to Mr. J. F. Robinson for his *Flora of the East Riding*, and as the executor of Richard Spruce placed all the papers relating to Spruce's South American travels in the hands of Dr. Alfred Russell Wallace, who published them as

1647. BALFOUR, F. R. S. Gaston Allard, of Angers. Roy. Bot. Gard. Kew Bull. Misc. Inform. 1918: 124-125. 1918.—Brief obituary of M. Allard, who died in January, 1918, nearly 80 years of age, and a note upon his famous arboretum, containing a large collection of trees from North America, China, Japan, and the Mediterranean littoral, which has been bequeathed to the Pasteur Institute.—*M. F. Warner.*

1648. BOIS, DÉSIRÉ. Jules Poisson (20 avril 1833—31 novembre 1919). Bull. Soc. Nat. Acclim. France 67: 18-19. 1920.—Poisson was extraordinarily gifted in his knowledge of plants, particularly in identification of fragmentary material. He described many new genera and wrote a monograph of the Casuarineae. The genus *Poissonia* (Leguminosae) was dedicated to him by Baillon.—*M. F. Warner.*

1649. BORZI, ANTONINO. [Giovanni Briosi.] Atti R. Accad. Lincei Roma Rendiconti Cl. Sci. Fis. Mat. e Nat. 29: 118-123. 1920.—Born April 29, 1846; died July 20, 1919. [See also Bot. Absts. 7, Entry 707; 8, Entry 895.].—*M. F. Warner.*

1650. BOULGER, G. S. A seventeenth-century botanist friendship. Jour. Botany 56: 197-202. 1918.—Evidence of the friendship of the elder John Tradescant with Parkinson is found in the numerous passages of his Paradisus in which Parkinson mentions Tradescant. At the end of the copy of the Paradisus here discussed there is, apparently in the handwriting of John Tradescant himself, a list of plants received in various years. Also a manuscript list, almost certainly in the handwriting of Elias Ashmole, of Trees found in Mr. Tradescants Ground when it came into my Possession. The date of this list is probably about 1662.—*Neil E. Stevens.*

1651. BOWER, F. O. Botanical research in the United Kingdom during the war. Amer. Jour. Sci. 47: 117-122. 1919.—A summary of the more important botanical discoveries and publications during the period of the great war.—*Neil E. Stevens.*

1652. BRAUN, SIEGFRIED. Zum 200jährigen Jubiläum der Baumschulfirma Ludwig Späth in Berlin-Baumschulenweg am 11. September 1920. [For the celebration of the 200th anniversary of the nursery firm Ludwig Späth, September 11, 1920.] Möllers Deutsch. Gärt. Zeitg. 35: 232-233, 238-240, 258-260. Illus. 1920.—The business was founded in September, 1720, by Christoph Späth, who died May 1, 1746, aged 50 years, and has been carried on by the family for 5 successive generations: Karl Friedrich (1721-1782), Karl Friedrich, Jr. (1768-1831), Johann Ludwig Karl (1793-1883), Franz (1839-1913), and the present head of the firm, Dr. Hellmut Späth.—*M. F. Warner.*

1653. [BRITTEN, JAMES.] An averted calamity. Jour. Botany 56: 50-52. 1918.—This note deals chiefly with the contemplated appropriation of the buildings of the British Museum (Natural History) for war purposes. The last paragraph, however, names various ways in which the department of botany of that institution has rendered direct service to the government during the war.—*Neil E. Stevens.*

1654. BRITTEN, JAMES. Tournefort's "Topographie Botanique." (Bibliographical notes LXXI.) Jour. Botany 56: 118-121. 1918.—A description of a little-known manuscript, now in the Department of Botany of the British Museum, with references to information regarding this and other manuscripts of Tournefort.—*Neil E. Stevens.*

1655. BRITTEN, JAMES. Maund's "The Botanist" (1836-1842?). (Bibliographical notes. LXXIII.) Jour. Botany 56: 235-243. 1918.—The first number of The Botanist was printed about September, 1836, and the last probably in 1842, as determined by evidence presented in this note. The magazine is described and a list of the new species published therein is given; as well as some notes on the "conductor," Benjamin Maund, and several contributors.—*Neil E. Stevens.*

1656. BRITTEN, JAMES. Blake's plant names. *Garden* 84: 80-81, 243-244, 276. 1920.—Identification of plants described under old (and very badly spelled) English common names in STEPHEN BLAKE's *Compleat Gardeners Practice*. [See also Bot. Abstrs. 8, Entries 1674, 1717.]—*M. F. Warner*.

1657. [BRITTEN, JAMES.] Clarence Bicknell. *Jour. Botany* 56: 303. 1918.—Clarence Bicknell (1842-1918) was the author of a quarto volume (1885) on the Flowering Plants and Ferns of the Riviera and Neighboring Mountains.—*Neil E. Stevens*.

1658. [BRITTEN, JAMES.] Claude Frederick Hugh Monro. *Jour. Botany* 56: 335. 1918.—Monro (died Aug. 14, 1918, aged 55) was a collector of plants in Rhodesia, and published 2 papers, 1 on the grasses and 1 on the trees of the region.—*Neil E. Stevens*.

1659. BRITTEN, JAMES. The cultivated dahlia. *Jour. Botany* 56: 33-35. 1918.—The introduction of the dahlia to the gardens of England was practically due to Lady Holland who, in 1804, sent seeds from Spain.—*Neil E. Stevens*.

1660. BRITTEN, JAMES. The Duchess of Beaufort's flower drawings. *Garden* 84: 428-429. 1920.—The Duchess, who died in 1714, was the friend of Sir Hans Sloane and in correspondence with the principal botanists and horticulturists of her day. Her herbarium, now in the Department of Botany of the British Museum (Natural History), is frequently quoted in Aiton's *Hortus Kewensis* for the first introduction of plants into England. These 2 volumes of paintings of plants grown at Badminton at the beginning of the 18th century include a great many species which have hitherto been supposed to have been introduced to living collections at a much later date, while a number of them are no longer in cultivation. The plates of the 1st volume were done by Everard Kickius and some of them are very fine; while those of the other volume, by Daniel Francom, have less artistic merit, but are very faithful representations.—*M. F. Warner*.

1661. [BRITTEN, JAMES.] Edward Walter Hunnybun (1848-1918) and "The Cambridge British Flora." *Jour. Botany* 56: 248-250. 1918.—A short sketch of Hunnybun's life is preceded by a description of his methods of work in preparing illustrations for *The Cambridge British Flora*.—*Neil E. Stevens*.

1662. [BRITTEN, JAMES.] Ernest David Marquand (1848-1918). *Jour. Botany* 56: 187-189. 1918.—Marquand was "an all-round naturalist," best known for his studies on the flora of Guernsey.—*Neil E. Stevens*.

1663. BRITTEN, JAMES. Felix Gilbert Wiltshier (1882-1917). *Jour. Botany* 56: 117-118. 1918.—Wiltshier was in charge of the library of the Department of Botany of the British Museum from 1905 until he entered the army in 1916, and contributed various important bibliographical notes to the *Journal of Botany*.—*Neil E. Stevens*.

1664. BRITTEN, JAMES. "John" Roxburgh. *Jour. Botany* 56: 202-203. 1918.—The supposed botanist of this name seems to be fictitious. The collecting attributed to him was probably done by WILLIAM ROXBURGH, author of the *Flora Indica*, whose son James bore part of the expense of its publication.—*Neil E. Stevens*.

1665. BRITTEN, JAMES. Lady Anne Monson (c. 1714-1776). *Jour. Botany* 56: 147-149. 1918.—Lady Monson was a student of the plants and insects of the East Indies.—*Neil E. Stevens*.

1666. BRITTEN, JAMES. Morandi's 'Historica [sic] Botanica Practica.' (Bibliographical notes LXXII.) *Jour. Botany* 56: 212-217. 1918.—Description of the *Historia Botanica Practica* (Mediolani, 1744) of Giovanni Battista Morandi, and of a very interesting manuscript in the Department of Botany of the British Museum which comprises 122 original drawings for this book, and 4 works in Morandi's own hand: an *Explicatio Plantarum*, which

partly corresponds to that in the *Historia*, a *Dilucidatio vocum quibus rei Herbariae Scriptores uti solent*, and 2 smaller works.—*M. F. Warner*.

1667. BRITTEN, JAMES. The name *Mundia*. *Jour. Botany* 56: 56. 1918.—The name seems to have been given in honor of a collector of South African plants named Mundt or Mund, not in honor of Henry Mundy.—*Neil E. Stevens*.

1668. [BRITTEN, JAMES.] Newspaper botany. *Jour. Botany* 58: 136, 208. 1920.—Errors and absurdities noted in the *Daily News* and *Nash's Magazine*.—*M. F. Warner*.

1669. [BRITTEN, JAMES.] The shamrock. *Jour. Botany* 58: 117–118. 1920.—Some newspaper blunders in regard to this plant.—*M. F. Warner*.

1670. BRITTEN, JAMES. Sir George Birdwood and "Primrose Day." *Jour. Botany* 56: 87–90. 1918.—Sir George Christopher Molesworth Birdwood (1832–1917) was particularly interested in commercial vegetable products of Biblical and classical interest and was the first to identify the frankincense plant. The celebration of the anniversary of Lord Beaconsfield's death by the wearing of primroses was initiated by him.—*Neil E. Stevens*.

1671. BRITTEN, JAMES. Worthington George Smith (1835–1917). *Jour. Botany* 56: 243–247. 1918.—W. G. Smith was educated as an architect and illustrator, but the study of ancient ornament led him to the study of plant form and later to botany. He is known for his researches on fungi, and especially for his colored illustrations of fungi and other plants. [See also *Bot. Absts.* 6, Entry 62; 8, Entry 1683].—*Neil E. Stevens*.

1672. BROTHERSTON, R. P. About tomatoes. *Garden* 83: 86. 1919.—As early as 1578 both white and yellow sorts were recorded by Lyte as cultivated in England. They were often called "Love apples" or "Apples of love" in the early literature, but the true "Love apple" was *Solanum ovigerum*.—*M. F. Warner*.

1673. BROTHERSTON, R. P. Bacon's plants. *Garden* 84: 129. 1920.—It is concluded that the double white violet mentioned in Bacon's essays and *Sylva sylvarum* was a stock, and the "White Satyrian" of the *Sylva* was *Neottia spiralis*.—*M. F. Warner*.

1674. BROTHERSTON, R. P. Blake's plant names. *Garden* 84: 52. 1920. [See also *Bot. Absts.* 8, Entries 1656, 1717.]

1675. BROWNE, E. T. Ernst Heinrich Philipp August Haeckel. *Proc. Linn. Soc. London* 132: 39–43. 1921.—Sketch of the life and work of the eminent zoologist and evolutionist Ernst Haeckel (1834–1919), who in earlier years was also an enthusiastic botanist.—*M. F. Warner*.

1676. BUNYARD, E. A. The moon and horticulture. *Garden* 84: 186. 1920.

1677. BUNYARD, E. A. The "New orchard and garden" of William Lawson. *Jour. Pomology* 1: 125–134. *Fig. 16*. 1920.—Although Johnson's *History of English Gardening* gives the date as 1597, Lawson's book seems to have been actually published in 1617, and to have gone through 9 editions. Bunyard quotes from, and comments briefly upon, the different chapters.—*L. H. MacDaniels*.

1678. C., R. S. Curtis's "Botanical magazine." *Garden* 84: 3. 1920.—Varying dates in early volumes, and variations in date of same plate in different sets are noted. Dates on title-pages of an original set are 1787, 1788, 1790, etc., but a short set has 1790 as date of Vol. 1; and in a set of 45 Vols., evidently reprints, Vol. 1 is dated 1793. Dates of many individual plates are noted, but no water marks were discovered before 1810.—*M. F. Warner*.

1679. CARDIFF [WALES] PUBLIC LIBRARY. Catalogue of early works on botany, agriculture, and horticulture. Exhibited in connection with the Royal Agricultural Show. 23 p. Printed for the Library Committee of the Cardiff Corporation by the Western Mail Ltd.: Cardiff, 1919.—A brief list, but with rather full titles and full imprints. Annotated and arranged under date of 1st edition.—*Neil E. Stevens.*

1680. CAVARA, FRIDIANO. In memoria di tre botanici napoletani. [In memory of three Neapolitan botanists.] Bull. Orto Bot. Napoli 4: 317–327. *Portraits.* 1918.—FORTUNATO PASQUALE (1856–1917), whose interest was in the local flora of southern Italy. ORAZIO COMES (1848–1917), was specially known for his work in phytopathology, wrote many mycological works, and made an extended study of tobacco. ACHILLE TERRACIANO (1861–1917), worked in systematic and geographical botany and plant morphology.—*M. F. Warner.*

1681. CHRISTENSEN, H. R. Frederik Kølpin Ravn. Tidsskr. Landøkonomi 1920: 261–264. *Portrait.* 1920.—Born at Aalborg, Denmark, May 10, 1873, and died May 25, 1920, at East Orange, New Jersey. A short account of his life and work in plant pathology.—*M. F. Warner.*

1682. CLINTON, G. P. William Gilson Farlow. Phytopathology 10: 1–8. *Portrait.* 1920.—An appreciation of the work of W. G. Farlow (1844–1919) with personal notes and anecdotes, written by a former student and close personal friend. [See also Bot. Absts. 6, Entries 916, 947, 956, 963, 1463, 1470; 7, Entry 1593; 8, Entries 833, 1784, 1785.]—*Neil E. Stevens.*

1683. C[OTTON], A. D. Worthington G. Smith. Roy. Bot. Gard. Kew Bull. Misc. Inform. 1918: 30–31. 1918.—Obituary notice of W. G. Smith (1835–1917), best known to readers of the Gardeners' Chronicle for his illustrations made for that journal for more than 40 years, but who was also an antiquarian and a well-known mycologist.—*M. F. Warner.*

1684. COULTER, J. M. Journal of the Arnold Arboretum. Bot. Gaz. 69: 95–96. 1920.—A notice of the appearance of the first number (July, 1919) of this new quarterly journal.—*H. C. Cowles.*

1685. D. The lettuce. Gard. Chron. III, 67: 192–193, 201. *Figs.* 1920.—Chiefly cultural, but prefaced by notes on early history. There are 6 varieties mentioned by Gerarde (1597), and 15 in Miller's Gardeners' Dictionary (1757). There are differences of opinion in regard to the origin of the Cabbage and Cos lettuces, but both are probably from one species, *Lactuca scariola*, a native of central Europe and Asia. Crescentius (13th century) mentions *Lactuca romana*, which probably gave name to the French Laitue romaine or Romaine.—*M. F. Warner.*

1686. DEMAREST, S. A. A sketch of the life of Coe Finch Austin. Mem. Torrey Bot. Club 17: 31–38. 1918.—An intimate account by his daughter of C. F. Austin (1831–1880) who was best known for his work on mosses.—*Neil E. Stevens.*

1687. DETMER, WILHELM. Ernst Stahl, seine Bedeutung als Botaniker und seine Stellung zu einigen Grundproblemen der Biologie. [Ernst Stahl, his importance as a botanist and his position regarding some fundamental problems in biology.] Flora 111–112: 1–47. 1918.—The introduction deals briefly with the education and personality of Christian Ernst Stahl, but the bulk of the paper is devoted to a detailed review of his work, including both the results of his investigations in various fields, and his opinions on such questions as vitalism and natural selection. [See also Bot. Absts. 8, Entry 1697.]—*Neil E. Stevens.*

1688. DIXON, H. N. Robert Braithwaite (1824–1917). Jour. Botany 56: 23–25. 1918.—An appreciation of the scientific work of Dr. Braithwaite, especially in bryology. His herbarium is now in the British Museum (Natural History).—*Neil E. Stevens.*

1689. DURHAM, H. E. Past masters of garden craft. [Rev. of: MARSHALL, LIZZIE B. *L'horticulture antique et la poésie de Columelle (De re rustica livre X)*. Thèse accepté pour le doctorat de l'Université de Paris. Hachette et Cie.: Paris, 1918.] *Gard. Chron.* III, 66: 77. 1919.—"Columella wrote to guide the gardener with much detail and precision, and especially to help the owner of a small plot that he might reduce his daily bill for food by growing it himself." Eleven flowers are dealt with, and vegetables and herbs together to the number of 63, including 15 Brassicas.—*M. F. Warner*.

1690. DURHAM, H. E. What is a broccoli? *Gard. Chron.* III, 65: 243-244. 1919.—Historical and etymological note.—*Neil E. Stevens*.

1691. E[BERLE], E. G. Henry Hurd Rusby. *Jour. Amer. Pharm. Assoc.* 9: 1131-1132. *Portrait*. 1920.—A brief sketch of the life and activities of Doctor Rusby, who has been recently appointed to take charge of the Mulford Biological Exploration of the Amazon Basin.—*Anton Hogstad, Jr.*

1692. ESSARY, S. H. Samuel McCutchen Bain. *Phytopathology* 10: 185-188. *Portrait* (pl. x). 1920.—Born Eagleville, Tennessee, Jan. 14, 1869; died Knoxville, Jan. 30, 1919. His investigations on disease resistance in plants and his work as a teacher of botany are referred to. A chronological list of his publications is given.—*Neil E. Stevens*.

1693. FEDELI, CARLO. Il primo Orto botanico Pisano. [The first botanical garden of Pisa.] *Atti. Soc. Toscana Sci. Nat. Pisa (Proc. Verb.)* 27: 8-20. 1918.—Its original location in the "Cittadella Vecchia," or ancient citadel, is confirmed, and by careful comparison of documents the author clears up some confusion in dates, proving that on Oct. 27, 1544, the duke Cosimo I had already removed the monastery of S. Vito to make room for the garden; that Luca Ghini, then lecturer at Bologna, who had been invited to the chair of botany at Pisa, had not arrived there on Oct. 28, 1544, but that his first remuneration was recorded on the first Monday of March, 1545, while one of his letters, dated July 4, 1545, shows that the garden was functioning perfectly at that date.—*M. F. Warner*.

1694. FOËX, ETIENNE. Rapport sommaire sur la situation de la Société de Pathologie Végétale, au 31 décembre 1920. [Report of the condition of the Phytopathological Society of France. December 31, 1920.] *Bull. Soc. Path. Veg. France* 7: 133-134. 1920.—Report of the general secretary calling attention to the increase in membership and cooperative arrangements made with agricultural journals and also with the federation of natural history societies of France.—*C. L. Shear*.

1695. G[AMBLE], J. S. J. H. Lace, C.I.E., F.L.S. *Roy. Bot. Gard. Kew Bull. Misc. Inform.* 1918: 341. 1918.—John Henry Lace, who died in June, 1918, spent over 30 years as forest officer in the Punjab, British Baluchistan, Bengal, and Burma, and was an accurate botanist. His *List of the Trees, Shrubs, and Climbers of Burma* is the standard work in that field, and he described many new species in the *Decades Kewenses*. A nearly complete set of his collections is found at Kew, while his own herbarium has been presented to the Royal Botanic Garden at Edinburgh.—*M. F. Warner*.

1696. GAMBLE, J. S. John Henry Lace. *Proc. Linn. Soc. London* 131: 56-57. 1919.—Brief sketch of life and work of J. H. Lace (1857-1918) forest officer and botanist. [See also *Bot. Absts.* 8, Entry 1695.]—*M. F. Warner*.

1697. GERHARDT, KARL. Dem Andenken an Ernst Stahl. *Naturwiss. Wochenschr. N.F.*, 19: 145-149. 1920.—In memory of Christian Ernst Stahl, born June 21, 1848, died December 3, 1919. Estimate of his botanical work and appreciation of Stahl as teacher and friend. [See also *Bot. Absts.* 8, Entry 1687.]—*M. F. Warner*.

1698. GROSE, L. R. Maple sugar in colonial times. *Amer. Forestry* 26: 689-690. 1920.—Tench Coxe, in his *View of the United States* (Philadelphia, 1794), recommended the sugar

maple lands of Pennsylvania and New York as a source of general sugar supply for the United States. Although negligible from this point of view, maple sugar was of great importance among the colonial settlers and the Indians, as shown by quotations from early accounts as far back as 1684, in regard to the making of sugar from the "juice of the maple."—A. C. Atwood.

1699. GROVES, JAMES. Newspaper botany. Jour. Botany 58: 55. 1920.—Criticism of an article in the Daily Telegraph of January 14, 1920, which includes among noxious weeds *Spartina Townsendii*, well known for its value as a mud-binding plant.—M. F. Warner.

1700. GUADAGNO, MICHELE. La vegetazione della penisola sorrentina. [Flora of the Sorrento peninsula.] Bull. Orto Bot. Napoli 4: 133-178. 1918.—A list of works relating to this region, a branch of the Apennines terminating in the island of Capri, together with a brief physical description, and a very full account of botanical exploration from early times. Species described by early authors are enumerated, and a list of those collected by PIER ANTONIO MICHELI in 1710 is printed from his manuscript catalogue of 1714. Biographical data are supplied for many of the older and more obscure authors and collectors.—M. F. Warner.

1701. GUNTHER, R. T. The garden of the Rev. Walter Stonehouse at Darfield Rectory, in Yorkshire, 1640. Gard. Chron. III, 67: 240-241, 256, 268-269, 296. Fig. 116, 137. 1920.—Stonehouse was a friend and correspondent of William How, author of Phytologia Britannica (1650). He was established at Darfield in 1631, but after 1644 forcibly ejected by the Parliamentary Commissioners and imprisoned; he died in 1655, aged 58. Among the manuscripts of Magdalen College are 2 lists of plants grown at Darfield in 1640-1644, which are printed herewith; also plans of the garden and saffron garth in 1640. Stonehouse estimated the number of his plants as 866 in 1644, and they included 14 species from Virginia, 5 from Guinea, and 4 from New England. [See also Bot. Absts. 7, Entry 699.]-M. F. Warner.

1702. H[ALL], A. D. Spencer Pickering. Nature 106: 509-510. 1920.—Percival Spencer Umfreville Pickering (1858-1920) began his scientific career as a chemist, brilliantly demonstrating the hydrate theory of solution. His most important work, however, has been on the scientific problems of fruit growing, notably the poisonous effect upon trees of the root-excretions of grasses. Science and Fruit Growing, published in 1919, embodies the results of the Woburn experiments since 1896.—M. F. Warner.

1703. HAMBLIN, S. F. Gardening books for the client. Landscape Architecture 10: 121-127. 1920.—List of about 85 modern books, grouped under: (1) nature study and botany; (2) garden plants; (3) garden making; and (4) garden experiences.—N. E. Stevens.

1704. HARRIS, D. F. Anthony van Leeuwenhoek, the first bacteriologist. Sci. Monthly 12: 150-160. 1921.—This paper describes a bacteriologist's visit to Leeuwenhoek's grave and native city and his thoughts concerning some of the early workers.—L. Pace.

1705. HARSHBERGER, J. W. The old gardens of Pennsylvania, I.—Bartram arboretum and park. Garden Mag. 32: 78-80. Illus. 1920.—Begun by John Bartram in 1730, at Kingsessing, now within the city of Philadelphia. In it were planted many of the trees, shrubs, and herbs collected by Bartram and his son William on their travels. A number of the surviving old trees are mentioned and illustrated.—M. F. Warner.

1706. HARSHBERGER, J. W. The old gardens of Pennsylvania, II.—Humphry Marshall's. Garden Mag. 32: 137-139. Illus. 1920.—The arboretum of Humphry Marshall (Oct. 10, 1722-Nov. 5, 1801) was founded in 1773 near the present village of Marshallton in Chester county. Many large trees are still standing which were planted by him, and which furnished practical knowledge for his Arbustum Americanum: the American Grove (Philadelphia, 1785). The article is illustrated with photographs of some of these old trees and views of Marshall's house.—M. F. Warner.

1707. HEMSLEY, W. B. J. R. Jackson. *Gard. Chron.* III, 68: 234. 1920.—John Reader Jackson, born May, 1834; died October 28, 1920. In 1858 he became keeper of the Kew museums, which post he held until his retirement in 1901. He wrote many articles on economic botany for the *Technologist*, *Pharmaceutical Journal*, *Gardeners' Chronicle*, and other periodicals, and published a valuable work, *Commercial Botany of the Nineteenth Century*.—*M. F. Warner*.

1708. HENNING, ERNST. F. Kølpin Ravn. *K. Landbruks Akad. Handl. och Tidsskr.* 59: 352-354. *Portrait*. 1920.—Account of his life and mycological work. [See also *Bot. Absts.* 8, Entries 1641, 1681, 1804.]—*M. F. Warner*.

1709. HOEK, P. VAN. Lijst van officieele personen, Instellingen en Vereenigingen op Land-en Tuinbouwgebied. [List of officials, institutions and societies in agriculture and horticulture.] *Verslag. en Mededeel. Directie Landb.* [Nederland] 1919²: 1-156. 1919.—A list, with names of officials, of all agricultural and horticultural government and private institutions, laboratories, colleges, schools, societies, in the Netherlands.—*J. C. Th. Uphof*.

1710. HOEK, P. VAN. Lijst van officieele personen, Instellingen en Vereenigingen op Land-en Tuinbouwgebied. [List of officials, institutions and societies in agriculture and horticulture.] *Verslag. en Mededeel. Directie Landb.* [Nederland] 1920²: 1-120. 1920.—A list with names of officials, of all agricultural and horticultural government and private institutions, laboratories, colleges, schools, and societies in the Netherlands.—*J. C. Th. Uphof*.

1711. HOFFMANN, PAUL. Urkundliches von und über Christ'an Conrad Sprengel. [Documentary records by and about Christian Conrad Sprengel.] *Naturwiss. Wochenschr. N.F.*, 19: 692-695. 1920.—Records of Sprengel's birth, matriculation at the University of Halle, and other important events in his life are reproduced.—*Neil E. Stevens*.

1712. HOLMAN, G. H., AND F. S. CHAMBERS. Cranberry pioneers of Ocean County. *Proc. Amer. Cranberry Growers' Assoc. Ann. Convention* 50: 7-10. 1919.—This is a sketch of the history of cranberry growing in Ocean County, New Jersey.—*J. K. Shaw*.

1713. HOLMES, G. K. Three centuries of Tobacco. *U. S. Dept. Agric. Yearbook* 1919: 151-177. 1920.—A statistical presentation of the important facts and factors in the development of the tobacco industry in its agricultural, commercial and industrial aspects from colonial times to the present. Analysis of consumption shows a great gain in use, being now two-thirds of production. The analysis of the industrial aspect shows the industry to be one of considerable magnitude and importance. A brief note is included on tobacco in use among natives of the Americas before European settlement and on the beginnings of cultivation in the Virginia Colony, where the first was grown by John Rolfe at Jamestown in 1612.—*C. J. Shirk*.

1714. J[ACKSON], B. D. Henry Worsley Seymour Worsley-Benison. *Proc. Linn. Soc. London* 131: 67. 1919.—Born Aug. 14, 1845; died Dec. 14, 1918. He was lecturer in botany at Westminster Hospital, 1877-1889, and wrote two popular books on natural history, as well as papers on Darwin, and on the power of movement in plants.—*M. F. Warner*.

1715. J[ACKSON], B. D. Sir Frank Crisp. *Proc. Linn. Soc. London* 131: 49-51. 1919.—Obituary of Sir Frank Crisp (1843-1919), a lawyer whose hobby was microscopy, who had a fine museum of instruments and apparatus, with a complete collection of books on the microscope. As one of the secretaries of the Royal Microscopical Society he effected great improvements in its Journal from about 1878. He was also a generous patron of the Linnean Society.—*M. F. Warner*.

1716. JACOB, JOSEPH. C. G. van Tubergen (died January 25, 1919, aged 74 years). *Garden* 83: 87. 1919.—Personal appreciation of the head of the Haarlem firm of bulb growers of that name.—*Neil E. Stevens*.

1717. JACOB, JOSEPH. "The compleat gardener's practice." I-II. Garden 84: 6-7, 20-21. 1920.—A very rare book by "Stephen Blake, gardener," London, 1664. Nothing is known of him save what may be learned from this book, which is especially interesting for its vernacular names of plants, now mostly obsolete and many of them unrecognizable on account of Blake's erratic spelling. [See also Bot. Absts. 8, Entries 1656, 1674.]—*M. F. Warner.*

1718. JACOB, JOSEPH. Orange thyme. Garden 83: 111. 1919.—After an exhaustive search this herb was found listed in The Modern Gardener or Universal Kalendar, published from the manuscript of Thomas Hitt by James Meader in 1771.—*Neil E. Stevens.*

1719. JACOB, JOSEPH. Some tales of the tulip. Garden Mag. 32: 23-35. *Illus.* 1920.—Reference is made to the literature of the tulip mania in Holland (1635-1637), such as T'Samenspraecken tusschen Waermondt ende Gaergoedt, published by Adriaen Roman at Haarlem in 1637. The tulip has made a place for itself in general literature as well, for instance Addison's letter to the Tatler, Aug. 31, 1710, Edward Young's Universal Passion, 1725, and Jean de la Bruyère's Characters, originally published in 1688 and often translated into English. The Hortus Floridus of Crispin de Pas, 1614, is also mentioned, and the first tulip monograph, Le Floriste François by La Chesnée Monstereul, which was printed at Caen in 1654. One of the illustrations is a reproduction of the title-page of the latter which was printed at Rouen in 1658 and added to the original work. Other more modern literature is mentioned, concluding with the important historical study, Weizen und Tulpe, of Solms-Laubach, published in 1899.—*M. F. Warner.*

1720. JACOB, JOSEPH. Tulip tittle-tattle.—An early reference to tulip fanciers. Garden 84: 525. 1920.—Sir Thomas Browne, in his Garden of Cyrus, or the Quincunciall Lozenge, mentions the tulip, and gives marginal references to the works of Lauremberg and Petrus Hondius, whose Dapes Inemptae (probably published about 1619), records and disapproves the growing taste for tulips; while Lauremberg uses the word "Tulipomania" in 1632, 3 years before the time of the mania in Holland.—*M. F. Warner.*

1721. JAGGLI, MARIO. L'attivit  scientifica di Alberto Franzoni. [The scientific activity of Alberto Franzoni.] Boll. Soc. Ticinese Sci. Nat. 1919: 11-18. 1919.—An address delivered at Locarno on November 19, 1916, is here reported. The speaker calls attention to the important work of Alberto Franzoni as a botanical explorer in southern Switzerland and gives a description of his herbarium. The latter contains about 5500 phanerogams and over 1000 cryptogams, the mosses being particularly well represented.—*A. W. Evans.*

1722. JOHNSON, D. S. The Cinchona tropical botanical station again available. Science 51: 235-236. 1920.

1723. KILLERMANN, S[EBASTIAN]. Von einigen peruanischen Neueinf hrungen in unseren G rten um 1600. [Regarding some Peruvian introductions into our gardens about 1600.] Naturwiss. Wochenschr. N.F., 19: 369-373. 1920.—The sun flower (*Helianthus annuus* L.), four o'clock (*Mirabilis Jalapa* L.), and passion flower (*Passiflora* sp.)—*Neil E. Stevens.*

1724. KILLERMANN, S[EBASTIAN]. Zur  lteren Geschichte der Orchideen. [On the early history of the orchids.] Naturwiss. Wochenschr. N.F., 19: 351-357. 1920.—Early literature on orchids is cited. The discussion deals with the classification rather than the culture or introduction of these plants.—*Neil E. Stevens.*

1725. K STER, ERNST. Albertus Magnus und Goethe. Naturwissenschaften 6: 137-139. 1918.—Goethe's debt to the writings of Albertus de Bollstadt, or Albertus Magnus (13th century).—*Neil E. Stevens.*

1726. K STER, ERNST. Einige alte Gallenbilder. [Some ancient illustrations of galls.] Naturwiss. Wochenschr. N.F., 18: 766-769. *Fig. 1-3.* 1919.—Three figures of galls on *Quercus* originally published in the 15th and 16th centuries, are reproduced and discussed.—*Neil E. Stevens.*

1727. KÜSTER, ERNST. Georg Klebs (1857-1918). *Naturwissenschaften* 6: 681-683. 1918.—Outline of life and estimate of scientific work.—*Neil E. Stevens.*
1728. LAING, E. V. Trees in myth and legend. *Trans. Roy. Scottish Arboric. Soc.* 34: 195-209. 1920.—The article discusses the attitude of our ancestors and the ancients toward trees and the effect which trees had on the general trend of the lives of men; and deals in a general way with a few myths and legends about trees.—*C. R. Tillotson.*
1729. LONGO, BIAGIO. In memoria del Dott. Martino Savelli. *Bull. Soc. Bot. Ital.* 1919: 1-2. 1919.—Born Jan. 10, 1884; died Dec. 28, 1918. A brief note with list of 12 titles, chiefly mycological, published by Savelli.—*M. F. Warner.*
1730. LOYER, MAURICE. Henri Hua (1861-1919). *Bull. Soc. Nat. Acclim. France* 66: 161-163. 1919.—Brief obituary notice and personal appreciation.—*Neil E. Stevens.*
1731. MACOUN, W. T. [R. B. Whyte.] *Proc. Amer. Soc. Hort. Sci.* 15: 116. *Portrait.* 1918.—R. B. Whyte of Ottawa died Apr. 15, 1918. His garden contained the finest collection of herbaceous perennials in Canada, possibly in all America. He originated the Herbert raspberry in 1887, and was specially interested in the English gooseberry, having tested over 100 varieties. He had a large herbarium.—*M. F. Warner.*
1732. MANETTI, CARLO. Italo Giglioli. *Agric. Coloniale* 14: 401-404. *Portrait.* 1920.—An agricultural chemist and economist, born at Genoa, May 1, 1852, and died Oct. 1, 1920. A personal appreciation, with list of some 63 works, published between 1878 and 1918. [See also *Bot. Absts.* 8, Entry 1748.]—*M. F. Warner.*
1733. MARSHALL, L. B. L'horticulture antique et le poëme de Columelle (*De re rustica* livre X). Thèse accepté pour le doctorat de l'Université de Paris. [Ancient horticulture and the poem of Columella (*De re rustica* liber X.) Doctorate thesis, University of Paris.] Hachette et Cie.: Paris, 1918.—See *Bot. Absts.* 8, Entry 1689.
1734. MARZELL, HEINRICH. Ueber Alter und Herkunft deutscher Pflanzennamen. [On the age and origin of German plant names.] *Naturwiss. Wochenschr. N.F.*, 19: 641-645. 1920.—A somewhat popular discussion of the etymology of over 200 plant names.—*Neil E. Stevens.*
1735. MATTIROLO, ORESTE. P. A. Saccardo. *Bull. Soc. Bot. Ital.* 1920: 2-3. 1920.—A brief eulogy of Saccardo by the president of the Italian botanical society. [See also *Bot. Absts.* 8, Entries 1791, 1797.]—*M. F. Warner.*
1736. MATTIROLO, ORESTE. Saverio Belli. *Bull. Soc. Bot. Ital.* 1919: 21-22. 1919.—Saverio Belli was born at Domodossola May 25, 1852 (incorrectly printed 1892), and died April 7, 1919.—*Neil E. Stevens.*
1737. MERRILL, E. D. Page-heading of periodicals. *Jour. Botany* 56: 189. 1918.—In recent volumes of the Philippine Journal of Science there is printed "on alternate pages the title of the publication and title of article with name of the author, supplemented by the volume, number, and year." The upper right-hand corner of each new article bears the name of the publication, volume, year, and number.—*Neil E. Stevens.*
1738. MOLISCH, HANS. Goethe, Darwin und die Spiraltendenz im Pflanzenreich. [Goethe Darwin, and the spiral tendency in the plant kingdom.] *Naturwiss. Wochenschr. N.F.*, 19: 625-629. *Fig. 1-3.* 1920.—A popular discussion of the subject, with some citations of literature, including the work of the two authors named in the title.—*Neil E. Stevens.*
1739. MOLL, J. W. In memoriam Dr. S. H. Koorders. *Nederland. Kruidk. Arch.* 1919: 73-76. 1920.—Brief summary of Koorders' work, especially on the herbarium of woody plant of Java, numbering over 1100 species.—*M. F. Warner.*

1740. MONTEMARTINI, LUIGI. Giuseppe Cuboni. *Riv. Patol. Veg.* 10: 117-118. 1920.—Prof. Giuseppe Cuboni, director of the experiment station of vegetable pathology, died suddenly in Rome on Nov. 3, 1920. He was born at Modena in 1852. [See also Bot. Absts. 8, Entry 1763.]—*F. M. Blodgett.*

1741. MORSTATT, H. Die Entwicklung der Pflanzenpathologie und des Pflanzenschutzes. [The development of plant pathology and plant protection.] *Naturwiss. Wochenschr. N.F.*, 19: 817-822. 1920.—Some of the more important steps in the development of plant pathology in Germany and the U. S. A. are mentioned, with somewhat briefer reference to other countries. The various organizations and conferences which have contributed to the advancement of the international study of plant disease problems are mentioned. In conclusion, the interrelation of pathology, morphology, and physiology is pointed out.—*Neil E. Stevens.*

1742. MURRILL, W. A. The fruit-disease survey. *Mycologia* 13: 50-53. *Pl. 3.* 1921.—An account of the field meeting of phytopathologists in Virginia, West Virginia, Maryland, and Pennsylvania during the first week in August, 1920, for the study of fruit diseases. This meeting was of an international character, and was attended by Mr. W. B. Brierley of England, Mr. E. Foëx of France, and Mr. Rosatti of Italy.—*H. R. Rosen.*

1743. MURRILL, W. A. George Francis Atkinson. *Jour. New York Bot. Gard.* 19: 314-315. 1918.—Note of death on Nov. 14, 1918. [See also Bot. Absts. 8, Entry 1803.]—*Neil E. Stevens.*

1744. PAMPANINI, RENATO. Odoardo Beccari. *Agric. Colon.* 14: 449-453. 1920.—Beccari died at Florence Oct. 26, 1920, at the age of 77. From 1864 to 1880 he was chiefly engaged in exploration: With Doria in Borneo; in Eritrea; in New Guinea with D'Albertis; and in Sumatra. He had already published some results of his earlier travels, and in 1868 founded the *Nuovo Giornale Botanico Italiano*, to which he made numerous contributions. Upon his return to Italy in 1880 he devoted himself to his vast botanical collections, publishing his *Malesia* in 3 great volumes, with many monographic works on his special subject of palms, of which the 4 folio volumes in the *Annals of the Calcutta Botanic Garden* are the most important. He helped to establish the *Istituto Agricolo Coloniale Italiano*, at Florence. His botanical collections are in Florence, at the *Istituto di Studi Superiore*.—*M. F. Warner.*

1745. PANTANELLI, ENRICO. [C. A. Timiriazeff.] *Riv. Biol.* 2: 442. 1920.—Timiriazeff's death was announced in *Nature*, June 3, 1920. He was born in 1843 and was well known for his popular scientific works, several of which passed through many Russian editions, while others were translated into English. His experimental researches were summarized in a lecture before the Royal Society of London in 1903, on *The Cosmical Function of the Green Plant*.—*M. F. Warner.*

1746. PANTANELLI, ENRICO. Giuseppe Severini. *Ann. Botanica* 15: 54-56. *Portrait.* 1920.—Severini was born June 17, 1878; died April 17, 1918. A chronological list of his publications, 14 in number, comprises contributions on root bacteria, plant diseases, and plant nutrition, and papers on the fungi of Perugia.—*M. F. Warner.*

1747. PANTANELLI, ENRICO. Wilhelm Pfeffer (1845-1920). *Riv. Biol.* 2: 329-331. *Portrait.* 1920.—Summary and appreciation of Pfeffer's work in botany. [See also Bot. Absts. 8, Entries 1753, 1758.]—*M. F. Warner.*

1748. PARIS, GIULIO. Italo Giglioli. *Riv. Biol.* 2: 696-704. *Portrait.* 1920.—Giglioli died Oct. 1, 1920. He was born May 1, 1852, the son of Giuseppe Giglioli and Elena Hillyer of Blackheath (London). The article discusses his work as a teacher of agricultural chemistry at the *Scuola Superiore di Agricoltura di Portici* and at the University of Pisa; and his ability as an organizer and director of research. He was instrumental in establishing experimental

fields, on the Rothamsted plan, at Suessola, where a great number of experiments with different cereals were carried out between 1887 and 1904. His biological work was wholly concerned with plant production, and he was greatly interested in agricultural education and organization, and economics. During the war he threw himself ardently into the solution of various economic problems, and wrote much in the way of propaganda.—*M. F. Warner.*

1749. PAYNE, C. H. *Le chrysanthème en Chine*. *Le Chrysanthème* 24: 70-73, 88-89. 1920.—Reprint of original French text of the account of the chrysanthemum from *Mémoires concernant l'histoire &c. des Chinois*, Vol. 1, 1778, together with comment thereon in *Gardeners' Chronicle*, Dec. 14, 1918. [See also *Bot. Absts.* 8, Entry 891.]—*Neil E. Stevens.*

1750. PAYNE, C. H. *Did the tulip mania ever reach Italy?* *Garden* 83: 528. 1919.—Although Italian floricultural literature of the 17th century shows that the tulip was much grown and highly esteemed, there is no evidence that the mania in its violent form ever extended to Italy. [See also *Bot. Absts.* 8, Entry 848.]—*Neil E. Stevens.*

1751. P[AYNE], C. H. *M. Anatole Cordonnier*. *Gard. Chron.* III, 68: 246. 1920.—Cordonnier, who died at Turcoing, Nov. 3, 1920, in his 78th year, founded important nurseries at Bailleul, which were utterly destroyed by the fighting in that region during the war. During his earlier career he made a specialty of growing chrysanthemums, and published 2 small books on the subject, as well as others on fruit culture under glass.—*M. F. Warner.*

1752. PAYNE, C. H. *A rare old gardening book*. *Garden* 84: 357. 1920.—The Orchard and the Garden, published in London, 1602, does not appear to be mentioned anywhere save in *Mrs. Cecil's History of Gardening*. Is it possibly a reprint of some earlier publication? It is unlikely that *Lawson's New Orchard and Garden* is a reprint of this work, as *Lawson's* book was first published in 1597.—*M. F. Warner.*

1753. P[EIRCE], G. J. *Wilhelm Pfeffer*. *Science* 51: 291-292. 1920.—A sketch of the life of Wilhelm Pfeffer (1845-1920) pioneer plant physiologist and professor at Leipzig for over thirty years, by one of his American students.—*Neil E. Stevens.*

1754. PHILLIPS, E. P. *The importance of a properly equipped state herbarium to an agricultural country*. *South African Jour. Nat. Hist.* 2: 18-39. 1920.—Shows how systematic botany is fundamental to research—the need of a collection of specimens for reference and comparison—importance of preserving economic species as a mere matter of record—need of careful determination of host-plants in the study of phytopathological problems. A number of references on economic botany and the organization and work of botanical institutions are appended.—*M. F. Warner.*

1755. PIROTTA, ROMUALDO. *Pasquale Baccarini (5 aprile 1858—24 luglio 1920)*. *Nuovo Gior. Bot. Ital. N.S.*, 26: 235-244. *Portrait*. 1919 [1920].—Baccarini's genius for organization was shown at the Botanical Institute of Florence, where he carried on the work begun by Mattiolo. One of his great achievements was the establishment of the colonial herbarium at Florence. A list of 132 publications by him shows the diversity of his interests,—pathological, floristic, morphological, and historical.—*M. F. Warner.*

1756. PITTIER, HENRI. *La evolucion de las ciencias naturales y las exploraciones botánicas en Venezuela*. [The evolution of natural science and botanical exploration in Venezuela.] *Suplemento del No. 14 de "Cultura Venezolana."* 28 p. *Tip. Cultura Venezolana: Caracas*, 1920.—A series of lectures entitled *Botánica y Biología*, by Dr. DIEGO CARBONELL, takes up the evolution of natural history in Venezuela, distinguishing 3 periods: (1) That influenced by Humboldt; (2) the experimental period, influenced by Vargas; and (3) the "doctrinarian" period of Ernst and Villavicencio. Pittier differs with this classification, maintaining that such periods involve great leaders, such as Darwin, Haeckel, or Candolle, who have been lacking in Venezuela, and that botany is still in the exploration and collecting stage there, while agriculture has also made little progress. He takes up the botanical explorers of Vene-

zucla chronologically, beginning with PETER LOEFLING, who collected in 1754, N. J. von JACQUIN, HUMBOLDT, SCHOMBURGK, KARSTEN, PREUSS, and others, and concludes the work with a short bibliography on Venezuelan botany.—*P. G. Russell.*

1757. PRAIN, DAVID. Anne Casimir Pyramus de Candolle. *Proc. Linn. Soc. London* **131**: 51–52. 1919.—Personal appreciation of Casimir de Candolle, born Feb. 26, 1836, died Oct. 3, 1918.—*M. F. Warner.*

1758. PRINGSHEIM, HANS, UND E. G. PRINGSHEIM. Wilhelm Pfeffer. *Ber. Deutsch. Chem. Ges.* **53**: 36–39. 1920.—Obituary of Pfeffer (born March 9, 1845), with an estimate of his work as a physiologist.—*Neil E. Stevens.*

1759. R[AMSBOTTOM], J[OHN]. John Snell. *Jour. Botany* **58**: 158. 1920.—John Snell, whose death occurred at Preston, April 19, 1920, in his 42d year, was known in connection with the Ormskirk potato trials, testing varieties with reference to wart disease (*Chrysophlyctis endobiotica*).—*M. F. Warner.*

1760. REDDICK, D. New abstract journal. *Phytopathology* **11**: 29. 1921.—The appearance of Zentralblatt für die gesamte Landwirtschaft mit Einschluss der Forst- und Teichwirtschaft, der Tier-Pathologie, und Medizin from the press of Gebrüder Borntraeger, Berlin, is noted.—*B. B. Higgins.*

1761. RIDDELL, W. R. The pharmacopoeia of another botanical physician. *Trans. and Proc. Bot. Soc. Edinburgh* **28**: 1–23. 1920.—Plants employed by Samuel B. Emmons in his Vegetable family Physician (Boston, 1836).—*M. F. Warner.*

1762. RITTER, GEORG. Friedrich Ludwig. *Beih. Bot. Centralbl.* **36** (I. Abt.): 133–134. 1919.—Friedrich Ludwig was born Oct. 24, 1851, died July 22, 1918.—*Neil E. Stevens.*

1763. RIVERA, VINCENZO. Giuseppe Cuboni. *Riv. Biol.* **2**: 693–696. *Portrait.* 1920.—Cuboni was born at Modena Feb. 2, 1852, and died at Rome, Nov. 3, 1920. He brought a broad culture and enthusiasm to the solution of agricultural problems, and was instrumental in the development of many economic projects. His immediate personal researches were chiefly along phytopathological lines, and he stimulated valuable work on the part of his associates.—*M. F. Warner.*

1764. [ROBERTS, J. W.] Dr. S. M. McMurran. *Amer. Nut. Jour.* **13**: 71. 1920.—Stockton Mosby McMurran, born March 8, 1887; died September 5, 1920. Several of his phytopathological articles are noted.—*M. F. Warner.*

1765. ROBERTS, W. American plants in England. *Gard. Chron.* **III**, **67**: 52. 1920.—Advertisements of seeds and plants, chiefly from newspapers. An anonymous communication in Gentleman's Magazine, Dec. 1751, is mentioned, concluding with Seeds Arrived this Year from our North American Colonies, an extensive list quoted in full, under vernacular names probably at that time in use in North America, comprising trees, ornamental shrubs, and vines. Particular mention is made of a 12-page catalogue of William Wright of Edinburgh, advertising American trees collected in Canada by his brother John, who was said to have previously printed at London a catalogue comprising nearly 600 different kinds; but this has not been traced. Other London seedsmen offering American plants and seeds are mentioned. The most popular plant imported seems to have been the American aloe.—*M. F. Warner.*

1766. ROBERTS, W. A forgotten botanical artist: Miss Crabtree. *Gard. Chron.* **III**, **67**: 278. 1920.—Drawings made in the 18th century by Philippa Crabtree, who may have been the child of this name, born to John and Philippa Crabtree, Nov. 17, 1764. She sent to the Royal Academy in 1786 and 1787 three exhibits entitled "Flowers from Nature." Query: Is it not likely that she drew some of the unsigned plates in early volumes of the Botanical Magazine? Drawings by MARY ANN and ELIZABETH CRABTREE, 1816 to 1822, are also noted.—*M. F. Warner.*

1767. ROBERTS, W. Some little known botanists. *Gard. Chron.* III, 65: 147. 1919.—Eighteenth century medical men, gleaned from Musgrave's Obituary, and either not found or incompletely treated in Britten and Boulger's Biographical Index of British and Irish Botanists, are mentioned. Considerable data are given on Thomas Clarke, prominent in Jamaica affairs from 1774 to his death in 1792; Edwin Sandys of Wadham College (died 1731?), Thomas Brisbane (died 1742), James Newton (died 1750), Richard Kentish (died 1792), and many others are mentioned.—*M. F. Warner.*

1768. ROPER, I. M. Edward Baylis's "Botanic Physic." (Bibliographical notes. LXX.) *Jour. Botany* 56: 52-54. 1918.—A quarto volume of 563 pages with 41 full-size copper plates of medicinal plants, by Edward Baylis M.D., issued in parts during 1791 and 1792. The work is very rare and no information about the author can be traced.—*Neil E. Stevens.*

1769. SCHENCK, HEINRICH. Martin Schongauer's Drachenbaum. [The dragon tree of Schongauer.] *Naturwiss. Wochenschr. N.F.*, 19: 775-780. 1 fig. 1920.—The dragon tree (*Dracaena Draco*) is found in a copperplate of the "Flight into Egypt" engraved by Martin Schongauer about 1469-1474, over 100 years before the first botanical description and illustration by Clusius. Schongauer could not have drawn his plant from a printed description, as earlier works do not treat of it, while the Herbarius (1484) and Herbarium Apuleji Platonici (1480) had not yet been printed; moreover, the accuracy of the drawing shows that it could only have been made from the living tree. Little is known of Schongauer's life, but he had probably visited southern Spain or Portugal, whither the dragon tree must have been brought by voyagers to the Canaries as early as the middle of the 14th century, as evidenced by very ancient specimens recorded from Cadiz and Lisbon. Schenck further shows that Schongauer's drawing is not only the earliest known representation of the dragon tree, but was evidently the prototype of those found in the work of Dürer, Burgmair, Bosch, Juppe, and Grüninger.—*M. F. Warner.*

1770. SCHIPS, M. Die Idee von Typus und ihre Bedeutung für Morphologie und Systematik. [The idea of "type" and its significance in morphology and taxonomy.] *Naturwiss. Wochenschr. N.F.*, 18: 401-407. 1919.—A discussion of the development of the 2 opposed philosophical conceptions of the "type," or model, on which living things were created. The realistic, which held that a material type existed and might be found; and the idealistic, which held that the "type" existed only in the mind of the creator. This has, of course, no reference to modern discussions of nomenclatorial type.—*Neil E. Stevens.*

1771. SCHUSTER, JULIUS. Die Dokumenten-Sammlung Darmstaedter der Preussischen Staatsbibliothek und ihre Bedeutung als historisches Archiv für Naturwissenschaften und Medizin. [The Darmstaedter document collection of the Prussian state library and its importance as source for the history of natural science and medicine.] *Naturwiss. Wochenschr. N.F.*, 19: 707-710. 1920.—Some of the more important sources to be found in this library are indicated and the importance of research in the history of science is emphasized.—*Neil E. Stevens.*

1772. S[COTT], D. H. Edward Alexander Newell Arber. *Proc. Linn. Soc. London* 131: 39-48. 1919.—Biographical sketch of Newell Arber (1870-1918), and outline of his scientific work with particular reference to paleobotany. A chronological list (1899-1918), prepared by his wife, of 82 books and papers is appended. [See also *Bot. Absts.* 8, Entry 1643.]—*M. F. Warner.*

1773. SCOTT, D. H. The late Ethel Sargent. *Jour. Botany* 56: 115-116. 1918.—Miss Sargent was distinguished for her researches in cytology and in the comparative anatomy of seedlings. [See also *Bot. Absts.* 5, Entry 72.]—*Neil E. Stevens.*

1774. SEWARD, A. C. Reginald Philip Gregory. *Nature* 102: 247-248. 1918.—R. P. Gregory (1879-1918) was a "good all-round botanist," whose contributions to the knowledge of the genetics and cytology of giant races of *Primula* were of special interest. [See also *Bot. Absts.* 5, Entry 1234; 8, Entry 830.]—*Neil E. Stevens.*

1775. S[KAN], S. A. A. H. Hildebrand. Roy. Bot. Gard. Kew Bull. Misc. Inform. 1918: 32-33. 1918.—Arthur Hedding Hildebrand, C.I.E., whose death at the age of 65 is announced in The Times of January 7, introduced a number of interesting plants to cultivation, among others the remarkable *Lonicera Hildebrandiana*. He also experimented with the cultivation of English roses and strawberries in Burma, where he spent over 30 years as administrator.—*M. F. Warner*.

1776. S[KAN], S. A. Lady Barkly's drawings of orchids. Roy. Bot. Gard. Kew Bull. Misc. Inform. 1918: 342. 1918.—A collection recently presented to the Kew herbarium, comprising 51 orchids of British Guiana, and 7 from Jamaica, drawn from nature by Lady Barkly while her husband, Sir Henry Barkly, was governor of British Guiana, 1848-53, and of Jamaica, 1853-56. She died at Melbourne, Apr. 17, 1857. The collection also includes 66 drawings of Cape plants, mostly drawn by her daughter, Miss E. B. Barkly.—*M. F. Warner*.

1777. SMITH, H. I. James M. Macoun. Science 51: 478-480. 1920.

1778. SPRENGER. Karl Sprenger. Mitteil. Deutsch. Dendrol. Ges. 27: 354-356. *Portrait*. [1918?]-Born in Schwerin. After the Franco-Prussian war he had gone to Italy, and developed a garden at Vomero, near Naples, whence he introduced and distributed plants from all over the world. He travelled extensively in Spain in search of choice plants, and wrote many botanical papers. He died at Corfu in December, 1917.—*M. F. Warner*.

1779. STEFFEN, ALEXANDER. Aus der Geschichte der Garten-Aurikeln. [Bits of Auricula history.] Gartenflora 69: 113-115. 1920.—The vogue of this flower toward the end of the 18th century is recalled, and Neuenhahn's Annalen der Gärtnerey, which was largely devoted to it, and F. A. Kanngiesser's Aurikelflora are mentioned.—*M. F. Warner*.

1780. STEVENS, N. E. The botany of the New England poets. Sci. Monthly 12: 137-149. 1921.—Quotations are given from Longfellow, Whittier, Emerson, Holmes, and Lowell, showing their knowledge of plants.—*L. Pace*.

1781. STOPES, M. C. A new monthly botanical journal. Sci. Prog. [London] 13: 457. 1919.—A brief statement is given regarding the inauguration and scope of Botanical Abstracts.—*J. L. Weimer*.

1782. SYDOW, H. Ferdinand Theissen, S. J. Ann. Mycol. 17: 134-139. 1919 [1920].—An appreciation, with brief biography, of Ferdinand Theissen (1877-1919). A bibliography of his 52 mycological contributions is appended.—*H. S. Jackson*.

1783. TEALL, GARDNER. Collecting old-time garden books. House and Garden 37^s: 34-35, 68. *Illus.* 1920.—Virgil, Crescenzi, early English authors such as Plat and Worlidge, Evelyn's Sylva, Kalendarium, and translation of La Quintinye, and the Scot's Gardener of John Reid are mentioned; also early American works, such as Totler's Almanac for South Carolina, 1752, with its garden calendar, Squibb's Gardener's Calendar, 1787, and John Allen's The Husbandman's Guide, Boston, 1712. Two of the illustrations are incorrectly labelled; the portrait of "Remberti," i.e., Rembert Dodoens, could not have appeared in a 13th century book, since Dodoens was born in 1517, while "Andreas Gerardus" is a fictitious name, possibly intended for John Gerarde, though the portrait is probably one of Matthioli.—*M. F. Warner*.

1784. THAXTER, ROLAND. William Gilson Farlow. Amer. Jour. Sci. 49: 87-95. *Portrait*. 1920.—Doctor Farlow was born Dec. 17, 1844, died June 3, 1919. Since 1870 he held a position in Harvard University, the greater portion of the time as Professor of Cryptogamic Botany. The article contains the outstanding incidents of Doctor Farlow's life and an appreciation of his work. [See also Bot. Absts. 6, Entries 916, 947, 956, 963, 1463, 1470; 7, Entry 1593; 8 Entries 833, 1682, 1785].—*T. J. Fitzpatrick*.

1785. THAXTER, ROLAND. William Gilson Farlow. Bot. Gaz. 69: 83-87. *Portrait*. 1920.—A biographic sketch. [See also preceding Entry.]—*H. C. Cowles*.

1786. THOMPSON, H. S. Curtis's Botanical magazine. Garden 83: 576. 1919.—The author concerns himself with discrepancies in dates of early volumes.—*Neil E. Stevens*.

1787. THORPE, T. E. Armand Gautier. Nature 106: 85-86. 1920.—Emile Justin Armand Gautier, distinguished for his investigations in many branches of chemistry, was known to botanists for his work in plant biochemistry, especially concerning the "chemical transformations of various products in the life-history of vegetable organisms."—*Neil E. Stevens*.

1788. TIMM, R. Zum achtzigsten Geburtstage Warnstorfs. [Warnstorfs eightieth birthday.] Hedwigia 60: 50-53. 1918.—An appreciation of the botanical work of Carl Warnstorf (born December 2, 1837) especially in the field of bryology.—*Neil E. Stevens*.

1789. TONI, G. B. DE. Commemorazione dei soci defunti G. Briosi e P. Baccarini. Bull. Soc. Bot. Ital. 1919: 59-62. 1919.—In memory of the deceased members Giovanni Briosi (1846-1919), and Pasquale Baccarini (1858-1919).—*Neil E. Stevens*.

1790. TONI, G. B. DE. [Lucio Gabelli.] Bull. Soc. Bot. Ital. 1918: 54-55. 1918.—Gabelli died Sept. 7, 1918. A brief note on his botanical work, most important being his study of the Gnetaceae.—*M. F. Warner*.

1791. TRAVERSO, G. B. Pier Andrea Saccardo. Riv. Biol. 2: 145-148. *Portrait*. 1920.—Saccardo was born April 23, 1845, died February 11, 1920. His work as a mycologist is outlined, and there is brief mention of his interest in botanical history, which resulted in such books as his *La Botanica in Italia* (2 Vol., 1895, 1902) and *La Cronologia della flora Italiana* (1909).—*M. F. Warner*.

1792. TRUE, R. H. Beginnings of agricultural literature in America. Bull. Amer. Library Assoc. 14⁴: 186-194. 1920.—Some data are to be found in narratives of early European explorers, the voyage of Captains Amadas and Barlowe, and Peter Martyr's *Decades of the Newe World*; those of the first colonists, John Smith in Virginia, Bradford and Winthrop in Massachusetts, and for the French provinces the *Jesuit Relations*. To the succeeding period of colonial expansion and freer communication with Europe belong John Clayton's *Letter on Virginia* (1688), Josselyn's *Voyages*, Francis Moore's *Voyage to Georgia* (1744), and Kalm's *Travels into North America*. About this time began the first definitely agricultural publications, of which Jared Eliot's *Essay upon Field-Husbandry in New England* (1748), with its continuations, may be considered the most important American agricultural writing of the colonial period. Following the Revolution, a number of works of the most practical and experimental character were published by John Beale Bordley, and during this time also appeared Deane's *New England Farmer*, a typical agricultural dictionary. This was also the time of the rise of agricultural societies in South Carolina, Pennsylvania, Massachusetts and New York; their papers were at first usually printed in the newspapers, and the first volume from such a source was published by the Massachusetts Society for Promoting Agriculture in 1799. The first distinctly agricultural periodical in the country was the *Agricultural Museum* (Georgetown, D. C., 1810), while the *American Farmer* was founded by Skinner in 1819.—*M. F. Warner*.

1793. TURRILL, W. B. The Rev. H. F. Tozer and plants collected by him in the nearer East. Roy. Bot. Gard. Kew Bull. Misc. Inform. 1920: 29-31. 1920.—The Rev. H. F. Tozer was born in 1829 and died June 2, 1916. He travelled extensively, especially in Greece and the old Turkish Empire, and wrote many books and articles on these regions. Some of his plants, which have recently been presented to Kew, are from localities little known to botanists.—*M. F. Warner*.

1794. UNITED STATES. 66TH CONGRESS, 2D SESSION. JOINT COMMITTEE ON THE LIBRARY. Hearing on S. 497, a bill to increase the area of the United States botanic garden in the city of Washington, District of Columbia, and S. Res. 165, directing the committee on the District of Columbia to report plans for the creation in or near the District of Columbia of a botanic garden comparable with the best existing botanic gardens. Part 1-2. 58 + v + 59-152 p., 4 maps. Government Printing Office: Washington, 1920.—Part 1, Committee hearings, is devoted to testimony of experts on the requirements and possibilities of botanic gardens. Part 2 includes extracts from numerous publications on botanic gardens and their functions, a compilation of statistics in regard to existing gardens, and a list of references to literature on the subject, together with a history of the present garden in Washington.—*M. F. Warner.*

1795. VAUGHAN, JOHN. The music of wild flowers. 181 p. E. P. Dutton & Co.: New York, 1920.—A collection of essays, most of which have some bearing on the British local flora, but the 1st, which gives title to the volume, is on the recreation a number of distinguished men have found in field botanical study: The philosophers Rousseau and John Stuart Mill; the poets Gray, Crabbe, and Tennyson; Charles Kingsley; Prof. Hort, the Greek scholar; and Edward Cowell, professor of Sanskrit at Cambridge. The 2nd essay, An Old Herbal, describes the first edition of Fuchs' History of Plants (Basle, 1542), and especially the copy belonging to the library of Winchester Cathedral, in which the English names have been written beneath each plant, evidently by a competent botanist, and in all probability soon after the publication of the work. It is suggested that this copy of Fuchs may have originally been owned by John Warner, a prebendary of the Cathedral from 1549, Dean of Winchester from 1559 until his death in 1564, and a physician as well as a clergyman. His interest in botany is evident from the fact that 2 other botanical books in the Cathedral library contain his name.—*M. F. Warner.*

1796. VAUPEL, FRIEDRICH. Aus der alten Kakteenliteratur. Monatsschr. Kakteenk. 27: 83-85, 104-107, 113-116, 129-132, 141-146. 1917; 28: 53-54, 71-72, 105-108, 124-126, 136-138. 1918; 29: 25-31, 49-54, 61-66, 115-120, 127-128, 140-144. 1919.—Reprints of diagnoses, descriptions of plates, and a few other notes from the following: Salm-Dyck, Observationes botanicae in horto Dickensi notatae (1822); Candolle, Catalogus plantarum horti botanici Monspelienensis (1813); Plumier, Plantarum americanarum fasciculus octavus (1758); Oviedo, Coronica delas Indias; Lobel, Plantarum seu stirpium historia; Mattioli, Commentarii in sex libros Pedacii Dioscoridis Anazarbei de medica materia; Acosta, Historia natural y moral de las Indias.—*M. F. Warner.*

1797. VUILLEMIN, PAUL. Émile Boudier (1828-1920)—Pier Andrea Saccardo (1845-1920). Rev. Gén. Sci. Pures et Appl. 31: 233-234. 1920.—The deaths of 2 great leaders in mycology are recorded.—*M. F. Warner.*

1798. WARNER, H. H. A garden in the sixteenth century. Garden 84: 321. 1920.—Garden of the rectory in the little village of Bishopsbourne near Canterbury, which remains today very much as "the learned and judicious" Richard Hooker, rector from 1595 to 1600, made it.—*M. F. Warner.*

1799. WARNER, H. H. Shakespeare and the garden. Garden 84: 406-407. Fig. 1920.—Chiefly quotations from Shakespeare relating to flowers and gardens; the number of plants mentioned by him is said to be about 150.—*M. F. Warner.*

1800. WARNER, M. F. Exostemma Sanctae Luciae. Jour. Botany 56: 55. 1918.—A communication read before the American Philosophical Society February 20, 1784, though not printed until 1786, includes a popular description of the plant by George Davidson, under the name *Cinchona Caribaea Sanctae Luciae*.—*Neil E. Stevens.*

1801. WARNER, M. F. The literature of horticulture. Library Jour. 44: 766-776. 1919.—Paper presented at Agricultural Libraries Section, American Library Association, Asbury

Park, June 26, 1919, under title: Bibliographical Opportunities in Horticulture. [See Bot. Absts. 8, Entry 918.]—*Neil E. Stevens.*

1802. WARNER, M. F. A Virginia garden in 1774. Jour. Internat. Garden Club 3: 191-195. 1919.—Extracted with running comment from the diary of PHILIP VICKERS FITHIAN, while tutor at Nomini Hall, Westmoreland County, Virginia. His observations on garden plants and operations, and miscellaneous details of agricultural practice in that locality, together with some notes on climate and times of flowering and fruiting are covered.—*M. F. Warner.*

1803. WHETZEL, H. H. George Francis Atkinson. Guide to Nature 12: 70-72. *Portrait.* 1919.—Popular account of Atkinson as mycologist.—*Neil E. Stevens.*

1804. WHETZEL, H. H., and H. B. HUMPHREY. Frederick K  lpin Ravn. Phytopathology 11: 1-5. *Portrait.* 1921.—A brief biographical sketch and appreciation.—*B. B. Higgins.*

1805. WILCOX, E. M. Harvey Elmer Vasey. Phytopathology 9: 299-300. *Portrait.* 1919.—A sketch of H. E. Vasey (1890-1918).—*Neil E. Stevens.*

1806. W[ILLIS], J. C. Dr. Alberto L  fgren. Proc. Linn. Soc. London 131: 57-58. 1919.—He was born in Stockholm Sept. 1854, and studied at the University of Upsala, but accompanying the Regnell expedition to southern Brazil in 1874, he remained in that country all his life, dying at Rio de Janeiro Aug. 30, 1918. His publications are comparatively few, though he had the most complete knowledge of the Brazilian flora of any botanist of his time. His collections are mostly at Sao Paulo and at Rio de Janeiro, with duplicates at Copenhagen, Stockholm, Berlin, and the Glaziou collection.—*M. F. Warner.*

1807. WILSON, W. F. David Douglas, botanist at Hawaii. 83 p., illus. (including portraits). Honolulu, 1919.—Reprint of various materials relating to Douglas (1798-1834).—*Neil E. Stevens.*

1808. WOODRUFF, L. L. History of biology. Sci. Monthly 12: 253-281. 1921.—Biology as the science of life really had its beginnings with the Greeks. Aristotle, Theophrastus, Hippocrates, Dioscorides, Pliny, van Leeuwenhoek, Malpighi, Grew, Linnaeus, Harvey, Cuvier, Huxley, Agassiz, Weismann, Mendel, Darwin, Gray, and many others are characterized in a few incisive statements.—*L. Pace.*

1809. ZIRPOLO, G. Michele Geremicca. Riv. Biol. 2: 704-706. *Portrait.* 1920.—An outline of the life and botanical work of Geremicca, who was born in Naples Nov. 9, 1857, and died there June 17, 1920. He published many works, chiefly on morphology and physiology, and was also greatly interested in the history of Italian botanists, publishing in the *Bullettino della Societ   dei Naturalisti* a few chapters of a systematic index to botanical literature.—*M. F. Warner.*

BOTANICAL EDUCATION

C. STUART GAGER, *Editor*

ALFRED GUNDERSEN, *Assistant Editor*

(See also in this issue Entries 1892, 1926, 2141, 2231)

1810. ANONYMOUS. Museums in education. Nature 106: 269-270. 1920.—An editorial on the Final Report of Committee, British Association, Section L (Cardiff, 1920). The suggestion is endorsed that there be a central council to aid in the inception of museums and to coordinate their work when established.—*O. A. Stevens.*

1811. ANONYMOUS. Programma onderwijs Rijksbloembollenschool. [Educational program of the Government bulb school.] Weekbl. Bloembollencult. 30: 120. 1919.—The course

occupies 3 years. The main object is to develop horticulturists especially trained in bulb raising. The school is located at Lisse, Netherlands.—*J. C. Th. Uphof*.

1812. ANONYMOUS. [Rev. of: COULTER, J. M., and M. C. COULTER. *Plant genetics*. ix + 214 p. The University of Chicago Press: Chicago, 1918 (see Bot. Absts. 2, Entry 395).] *Sci. Prog.* [London] 13: 502-504. 1919.

1813. ANONYMOUS. [Rev. of: GAGER, C. S. *Fundamentals of Botany*. xix + 640 p. P. Blakiston's Son & Co.: Philadelphia, 1916, Reprinted, 1917.] *Sci. Prog.* [London] 13: 504-505. 1919.

1814. ANONYMOUS. [Rev. of English translation, by LIVINGSTON, B. E., of: PALLADIN, V. I. *Pflanzen-Physiologie*. (Plant Physiology.) xxv + 320 p. P. Blakiston's Son & Co.: Philadelphia, 1918.] *Sci. Prog.* [London] 13: 502. 1919.

1815. ANONYMOUS. [Rev. of: ROBBINS, W. W. *The botany of crop plants*. xx + 681 p. 263 fig. P. Blakiston's Son & Co.: Philadelphia, 1917.] *Sci. Prog.* [London] 13: 676-677 1919.

1816. ANONYMOUS. [Rev. of: WHITING, A. L. *Soil biology laboratory manual*. x + 143 p. John Wiley & Sons: New York; Chapman & Hall, Ltd.: London, 1917.] *Sci. Prog.* [London] 13: 505. 1919.

1817. CLUTE, WILLARD N. *Plant names and their meanings*—V. *Amer. Bot.* 27: 18-23. 1921.—The derivation of scientific and vernacular names of the Liliaceae is discussed.—*S. P. Nichols*.

1818. HELLAND-HANSEN, BJÖRN. *Den biologiske station*. [The biological station.] Bergens Mus. Aarsberetning 1918-1919: 76-77. 1919.—Annual report of activities and publications.—*A. Gundersen*.

1819. KREUTZER, E. *Zur forstlichen Hochschulfrage in der Tschecho-Slowakei*. [The question of forest colleges in Czecho-Slovakia.] *Allg. Forst- u. Jagd-zeitg.* [Wien] 38: 148-149. 1920.—The establishment of one or more agricultural colleges in Czecho-Slovakia is being considered. This leads to a discussion of forestry education in general in the old Austrian Empire and its present tendencies in the component states. In general there seems to be a tendency to start more schools than the small size of the states warrants.—*F. S. Baker*.

1820. KTK. *Der deutsche forstliche Hochschulunterricht in der Tschecho-Slowakei*. [The German forestry college instruction in Czecho-Slovakia.] *Wiener Allg. Forst- u. Jagd-zeitg.* 38: 190-191. 1920.—The German Section of the Agricultural Council for Bohemia has a project under consideration for the establishment of a forestry college in Czecho-Slovakia. There are 3 alternatives: (1) Establishment of a new school; (2) establishment of a forestry branch of some technical college, perhaps at Prague or Brunn; (3) transformation of the Higher Forest Academy at Reichstadt. The 1st plan gives the most freedom of choice as to location, etc., but is expensive. The 2nd is inexpensive and has the advantage that a portion of the faculty is already furnished; but the location in a big city is undesirable. The 3rd plan has been adopted and presented to the government. It calls for the taking over of the Reichstadt Academy, the latter to be established as an independent branch of the Prague Technical College.—*F. S. Baker*.

1821. MARTIN, JOHN N. *Botany with agricultural applications*. 2nd ed. revised, xii + 604 p., 490 fig. John Wiley & Sons, Inc.: New York, 1920.—Full title of 1st edition is "Botany for agricultural students." Much of the text is rewritten, and new and additional illustrations are used. An additional chapter on "Variations" is included. [See Bot. Absts. 3, Entries, 1920, 2165].—*C. S. Gager*.

1822. NEEDHAM, J. G. The new wild life preserve near McLean, N. Y. *Sci. Monthly* 12: 246-252. *Fig. 1-2.* 1921.—This bog, 15 miles from Cornell University and always the object of interest and study, has recently been made into a wild life preserve and placed in the keeping of the Trustees of the Lloyd Library. A professor from one of the biological departments of Cornell University is to be custodian. The author has been designated as the first custodian. The preserve is an uncultivated area of about 100 acres. The 2 maps show the roads and houses in the vicinity, the topography, and the character of the vegetation. A fence to keep out grazing animals and signs inviting naturalists to enter for study but not for destruction are the protective measures adopted.—*L. Pace.*

1823. STEBBING, E. P. Higher forestry education for the empire. *Nature* 106: 438-440. 1920.—Discussion, relating chiefly to India, as to whether forest probationers should be trained at one central institution.—*O. A. Stevens.*

1824. VOLKEROZ, K. De opleiding tot vakondernijs in de bloembollenteelt en het tuinbou-wondernijs in de bloembollenteelt. [Professional training in bulb culture and horticultural education in the bulb district.] *Weekbl. Bloembollencult.* 30: 46-47. 1919.—A general outline is given of the horticultural education of the Government Horticultural Winter Schools and the Government Horticultural Winter Courses, especially with reference to the bulb-growing districts of the Netherlands. Winter courses (short courses) in the bulb districts are given in Bennebroek, Hillegom, Lisse, Sassenheim, and Noordwijk. A winter school is established at Lisse, also a course to train horticultural teachers in bulb raising. In the winter courses, 5 subjects are taught; in the winter schools 20 subjects, among them the English, German, and Russian languages. The winter schools and winter courses have 1768 and 300 lecture hours respectively; both courses extend over 2 years.—*J. C. Th. Uphof.*

1825. WEATHERBY, C. A. What the Latin names mean—I. *Amer. Fern Jour.* 10: 113-115. 1920.—The article consists of a list of 41 specific names, beginning with *acrostichoides* and extending through *frondosa*, with origin and meaning of each.—*F. C. Anderson.*

CYTOLOGY

GILBERT M. SMITH, *Editor*

GEO. S. BRYAN, *Assistant Editor*

(See also in this issue Entries 1904, 1945, 1946, 2148, 2195)

1826. BAILEY, I. W. The cambium and its derivative tissues. III. A reconnaissance of cytological phenomena in the cambium. *Amer. Jour. Bot.* 7: 417-434. 4 pl. 1920.—The elements of the cambium in gymnosperms and angiosperms, although they may attain a very great length (9,000 microns), are uninucleate. The sphere of influence of the nucleus must, therefore, sometimes extend for several thousand microns. The nucleo-cytoplasmic ratio in cambial initials may vary greatly but in *Pinus Strobus*, at least, the chromosome number is always constant; and in all material examined chromosome size is also essentially constant. WINKLER's conclusion that there is a close correlation between cell size and chromosomal mass evidently does not hold for the cambium. The fusiform cambial initials, which are frequently several hundred times as long as they are wide, divide longitudinally in the tangential plane, the continual increase in the periphery of the cambium not being met by radial divisions but by the cells sliding by one another. The longitudinal division takes place through an extraordinary extension of the cell plate. The spindle fibers thicken between the daughter nuclei after mitosis, producing a cell plate, and this plate is extended upward and downward from the region of the nuclei through the operation of two masses of kinoplasmic fibrillae, the kinoplasmasomes, the new wall ultimately reaching both ends of the protoplast. The author discusses the types of cell plate formation described by various authors and believes that they represent different phases or stages of a single fundamental type of cytokinesis. The significance of the cambium in the investigation of various cyto-

logical problems, particularly of those relating to the cell plate and the dynamics of cytokinesis, is briefly discussed.—*E. W. Sinnott.*

1827. BEZSSONOF, N. Erscheinungen beim Wachstum von Mikroorganismen auf stark rohrzuckerhaltigen Nährboden und die Chondriomfrage. [Phenomena occurring in the growth of microorganisms on media of high cane-sugar content and the chondriosome question.] Centralbl. Bakt. II Abt. 50: 444-464. Pl. 1. 1920.—Molds cultivated on media with high cane-sugar content reacted, from a morphological point of view, as follows: The *Aspergillus* forms, *Penicillium glaucum* Bref. (Link), *Aspergillus Oryzae*, *A. candidus*, and *A. Wentii* produce fruiting bodies in the form of incipient perithecia. *A. Wentii* differs from the others in the shape of its ascogone and in this respect approaches the characteristic type of the Erysiphaceae. *Penicillium glaucum* produces giant conidia. *P. brevicaulis*, with its characteristic mycelium, deviates further from the others in its poor growth on cane-sugar media. *Rhizopus nigricans* produces zygospores, azygospores, and chlamydospores in cane-sugar solutions; sporangia were observed only on solid media.—The following physiological and cytological observations were made: *Aspergillus Oryzae* produces true alcoholic fermentation. The formation of ethyl alcohol was demonstrated both quantitatively and qualitatively. The fungi show fine granulation of the cytoplasm even in unstained material. Bacteria and fungi stain more intensely with nuclear stains because of the dispersion of the chromatin material. The accentuated development of generative cells, on media with high sugar concentration, the dispersed condition of the cytoplasmic units as well as the state of dispersion of the chondriosomes points to an intimate relation between these phenomena.—*Anthony Berg.*

1828. COWDRY, N. H. Experimental studies on mitochondria in plant cells. Biol. Bull. [Woods Hole] 39: 188-200. 3 pl. 1920.—The author has conducted experiments on the radicles of seedling peas to determine whether mitochondria might be utilized as cytological indicators of cell activity. The conclusion is that "mitochondria are changed to an abnormal degree only under severe conditions which either kill the cell or render its recovery very improbable."—*Elda R. Walker.*

1829. DANGEARD, P. A. Observations relatives à la note precedente. [Observations regarding an earlier communication.] Compt. Rend. Acad. Sci. Paris 170: 1518. 1920.—Reference is made to the controversy between GUILLIERMOND and the author. The latter states that he still maintains his former contentions, but has nothing further to add at this time.—*C. H. Farr.*

1830. DANGEARD, P. A. Sur la métachromatine et les composés tanniques des vacuoles. [On the metachromatin and the tannin content of the vacuoles.] Compt. Rend. Acad. Sci. Paris 171: 1016-1019. 9 fig. 1920.—A study of the vacuoles of *Taxus baccata* and the effects of intravital stains indicate that the vacuoles are formed in association with metachromatin and that this material is distinct from the tannin bodies which are formed later.—*C. H. Farr.*

1831. EMBERGER, L. Étude cytologique de la Sélaginelle. [A cytological study of Selaginella.] Compt. Rend. Acad. Sci. Paris 171: 263-266. Fig. 1-6. 1920.—In the meristem and sporogenous tissues of *Selaginella* there are mitochondria of all types; plastes (one in each spore), microsomes of a lipid nature, and a vacuolar system of unknown constitution but similar to the metachromatin of fungi. The author differs with DANGEARD on his interpretation of these bodies.—*C. H. Farr.*

1832. GUILLIERMOND, A. Nouvelles observations cytologiques sur Saprolegnia. [New observations on the cytology of Saprolegnia.] Compt. Rend. Acad. Sci. Paris 171: 266-268. Fig. 1-6. 1920.—Vacuoles are found to be formed by the fusion of anastomosing canals. The fungus contains chondriosomes, fatty globules, and a vacuolar system which is not metachromatic in nature. Author finds that it is very difficult to distinguish the chondriocentes from the bacteria which are associated with the fungus.—*C. H. Farr.*

1833. GUILLIERMOND, A. Nouvelles recherches sur l'appareil vacuolaire dans les végétaux. [New investigations of the vacuolar system of plants.] *Compt. Rend. Acad. Sci. Paris* 171: 1071-1074. 25 fig. 1920.—Using the roots of beans and peas and the radicles of barley to trace the development of the vacuoles, the author concludes that the latter are formed from bodies which resemble mitochondria but are not true mitochondria.—C. H. Farr.

1834. GUILLIERMOND, A. Sur l'évolution du chondriome pendant la formation des grains de pollen de *Lilium candidum*. [The transformations of the chondriosome during formation of pollen grains of *Lilium candidum*.] *Compt. Rend. Acad. Sci. Paris* 170: 1003-1006. Fig. 1-11. 1920.—Chondriosomes in presynapsis consist of granular mitochondria, rods, and chondrioconts. During synapsis numerous small granules and a few large granules appear. The latter enlarge and become darker during diakinesis. In metaphase and during the homeotypic division, rods and chondrioconts are present. During microspore formation there are small granules and large plastids that become very distinct in the later stages.—C. H. Farr.

1835. HERRERA, A. L. Sur l'imitation des cellules, des tissus, de la division cellulaire et de la structure du protoplasma avec le fluorosilicate de calcium. [On the imitation of cells, tissues, cell-division, and the structure of protoplasm with calcium fluorosilicate.] *Compt. Rend. Acad. Sci. Paris* 170: 1613-1614. 1920.—A confirmation of the results of GAUTIER and CLAUSMANN on the biological importance of fluorine. Structures resembling cells are produced by the diffusion of KHF_2 and CaCl_2 into an alkaline solution of colloidal silica.—C. H. Farr.

1836. SHARP, L. W. Mitosis in *Osmunda*. [Rev. of: DIGBY, L. On the archesporial and meiotic phases of *Osmunda*. *Ann. Botany* 33: 135-172. 5 pl. 1919 (see Bot. Absts. 3, Entry 1933).] *Bot. Gaz.* 69: 88-91. 1920.—This paper is regarded as a very complete statement of the FARMER theory of the method of chromosome reduction, but it is felt that the figures fail to prove the theory advocated.—H. C. Cowles.

1837. WAGER, HAROLD. Presidential address. The significance of sex and nuclear fusions in the fungi. *Trans. British Mycol. Soc.* 6: 305-317. 1920.—The introduction to this address includes brief references to THOMAS GIBBS, SIR CHARLES THOMAS DYKE ACLAND, DR. ARTHUR ECKLEY LECHMERE, CHARLES OGILVIE FARQUHARSON, and ANTHONY WALLIS, mycologists who died during the year. A historical résumé of the development of knowledge concerning sex and nuclear fusions in fungi is given. Normal sexual fusion includes at least 2 phenomena, the blending of 2 distinct lines of descent, and rejuvenescence of the reproductive cell by means of which it receives a new stimulus to growth and division. In the higher fungi the blending of 2 lines of descent seems to have become superfluous and a simple type of nuclear fusion concerned only with rejuvenescence is taking the place of the more complex process of binary sexual fusion.—W. B. McDougall.

ECOLOGY AND PLANT GEOGRAPHY

H. C. COWLES, *Editor*

G. D. FULLER, *Assistant Editor*

(See in this issue Entries 1604, 1851, 1858, 1970, 2014, 2027, 2028, 2029, 2036, 2037, 2038, 2047, 2078, 2079, 2080, 2227, 2230, 2231, 2232)

FOREST BOTANY AND FORESTRY

RAPHAEL ZON, *Editor*J. V. HOFMANN, *Assistant Editor*

(See in this issue Entries 1819, 1820, 1823, 2009, 2010, 2011, 2105, 2107, 2109, 2121, 2123, 2124, 2187, 2227, 2234)

1838. ANONYMOUS. Departmental exploitation in the western Himalayas. *Indian Forester* 47: 1-11. 1921.

1839. ANONYMOUS. Forest Service. *Sci. Monthly* 12: 287. 1921.—This is a summary of Chief [U. S. A.] Forester W. B. GREELY's annual report.—*L. Pace*.

1840. ANONYMOUS. [Rev. of: HOWARD, A. L. *A manual of the timbers of the world, their characteristics and uses.* xvi + 446 p., 128 illus. Macmillan & Co.: London, 1920.] *Sci. Prog.* [London] 15: 499-500. 1921.

1841. BEESON, C. F. C. Food plants of Indian forest insects, Part V. *Indian Forester* 47: 21-25. 1921.—A continuation of previous work, the present compilation listing 25 insects which feed upon a variety of forest trees and shrubs.—*E. N. Munns*.

1842. BEESON, C. F. C. *Hoplocerambyx* and the dying off of sal. *Indian Forester* 47: 68-77. 1 fig. 1921.—A marked parallelism exists between the number of dead trees per year and the annual amount of rainfall; in abnormally wet years the number of sal dying is greatly increased, in abnormally dry years the number is very markedly decreased. The emergence period of the sal borer (*H. spinicornis*) is directly influenced by the initial date and extent of the rains through their effect on the moisture content of the heartwood of the sal and the relative humidity of the pupal chamber. In a wet year 75 per cent of the beetles emerge in the 1st month of the rains; in a dry year the period is prolonged nearly 2 months. The wet year increases the damage to sal by bad aeration through a rise in the water table, especially on heavier soils. This weakening renders the tree much more susceptible to the borer attacks, the borer acting as a secondary factor.—Control measures during an epidemic call for the removal from the forest before the end of April of all attacked parts of trees down to 18 inches girth in normal years and the removal of all parts of trees down to 12 inches girth in years of early and abundant precipitation. Removal of dead and dying trees on which the foliage is turning brown and trees with green foliage but with an abundant ejection of wood dust is indicated.—*E. N. Munns*.

1843. BENNETT, H. C. Experiments in sowing seeds of *Cassia auriculata* at Golla, Anantapur. *Indian Forester* 47: 25-29. 1921.—Six methods of seed sowing have been tried, each on 5 acres. Sowing in furrows gives the cheapest successful result, but plowing, hoeing, and harrowing give the best results.—*E. N. Munns*.

1844. BROWN, N. C. Vallombrosa forest in Italy. *Amer. Forestry* 26: 647-654. 15 fig. 1920.—The forest consists of 3500 acres, 875 acres chestnut and 125 acres containing 3 varieties of Italian pines. The remainder is made up of European beech (*Fagus sylvatica*) and silver fir (*Abies pectinata*). The forest has been under continuous management by Italian forestry officials since 1869, and for centuries before that date by the monks.—*Chas. H. Otis*.

1845. BUTLER, O. M. Forest conservation by better utilization. *Amer. Forestry* 26: 682-683, 691. 1920.

1846. CHAYTOR, A. H. Planting Douglas fir and Sitka spruce in cleared coppice. *Quart. Jour. Forest.* 14: 161-164. 1920.—Plantations of Douglas fir, Sitka spruce, and Japanese larch set out in old coppice woods at Iridge Place, Hurst Green, Sussex, England, from the years 1910 to 1913, were tended very carefully previous to the war, the rubbish and coppice

being cleared each year from around each tree; owing to the absence of woodsmen and keepers the trees were allowed to shift for themselves during the war. Under the latter condition the Douglas fir and Sitka spruce have thrived fully as well or better than under the former treatment. The larches have not been so successful under neglect, because where completely overtopped they have often died back at the tip or succumbed outright. Except where the tops have been whipped by the underwood, Douglas fir and Sitka spruce are in perfect health although completely covered by coppice. All that is required is the removal of overhead branches that will interfere with the growth of the leading shoot; to do more seems a waste of labor and money. During the war rabbits killed many larches but did little damage to Douglas fir or Sitka spruce. The fir and spruce, even up to 5 and 6 ft. high, transplant well if moved in autumn with a ball of earth. A spacing of 9 by 9 feet is advocated for Douglas fir in strong coppice.—*C. R. Tillotson.*

1847. CRAFT, Q. R. Timber conservation in Wyoming. *Amer. Forestry* 26: 740-741. 2 fig. 1920.

1848. GESCHWIND. Aus der Praxis der Saatschuldüngung im bosnisch-herzegovinischen Karstgebiete. [The practice of nursery fertilizing in the Karst region, Bosnia-Herzegovina.] *Wiener Allg. Forst- u. Jagd-Zeitg.* 38: 201-203. 1920.—Forest tree nurseries in the Karst (devoted to *Pinus austriaca*) are usually far from railroads. The soil is scanty and poor, and the nursery is soon in need of fertilizer not only to add the necessary chemical elements but to improve the physical condition of the soil as well. Owing to the difficulty of bringing in bulky fertilizers local sod has been used for some time with success by the writer. This is cut 14 × 50 cm. to fit between the seed rows (18 cm.) and placed grassy side down. It prevents compacting of the soil and discourages the growth of weeds; and as it rots (2 years) it enriches the soil. Small pieces of sod are gathered in heaps and covered with sod making in 2 years a rich compost that is spread between the rows after weeding.—The stock is grown for 2 years; after removal the remainder of the sod is turned in, the area reseeded and the space between the rows again sodded.—Soil collecting in holes in the limestone cliffs, a mixture of dust, lime fragments, mosses, algae, and bird and animal droppings, has also proved successful in maintaining the fertility of these nurseries.—*F. S. Baker.*

1849. GESCHWIND. Die Hasenschäden in den Schwarzkiefern-kulturen des Karstes. [Rabbit damage in Austrian pine plantations of the Karst.] *Allg. Forst- u. Jagd-Zeitg.* [Wien] 38: 159-160. 1920.—Rabbit damage is severe in plantations of Austrian pine (*Pinus austriaca*) in the Karst region of Bosnia-Herzegovina for a period of about 5 years after planting. Two-year old seedlings are planted in deep holes and a depression is left around the stem to catch water. This, with a circling wall of stones, enables rabbits to reach the tops for some years. The greatest damage occurs the 1st winter after planting and in regions where the tree is being newly introduced. The rabbits do not appear to eat the pines as food, as the injury is found when other food is abundant; the uneaten top is often found near the plant.—Recovery is more general than in other regions as the rainfall and temperature produce a long favorable growing season. Trees usually recover in 3-4 years, unless the terminal is eaten off before side buds are formed (at 3-4 years of age). Adventitious buds rarely develop under these circumstances. Such trees are replaced immediately while others are left to recover, as they usually do if well rooted. Hunting out the rabbits in fenced and cultivated places is the best way of combating the evil.—*F. S. Baker.*

1850. GESCHWIND. Der plenter- oder femelwaldartige Niederwald. [The coppice selection forest.] *Wiener Allg. Forst- u. Jagd-Zeitg.* 38: 237-238. 1920.—The selection form of coppice forest seems never to have been definitely described although it is very common throughout the Balkan peninsula and is found in parts of Switzerland. Any coppice forest will assume a somewhat uneven-aged form since sprouting is not limited to any one year, although the oldest age class will predominate; especially in southern (warm) climates, where sprouting tends to continue more or less through the entire rotation, the appearance of the stand is not even-aged but of a selection form. Under the undeveloped forestry systems of

the Balkans such stands are managed under a rough selection system. The sprouts suffer much less from grazing damage, wind and snow breakage, and dryness than when clean cut; but due to light deficiency there is poorer development, and suppression may ultimately lead to bad openings in the stands. Felling is very much more difficult than when a clean-cutting method is used as the stands are dense and trees lodge badly. The author does not advocate the method, merely describes it, but presumes that it is much better adapted to southern countries than to those farther north, since sprouting under deficient light is much better in the south.—*F. S. Baker.*

1851. GREENFIELD, W. P. The sand-dunes of the Lincolnshire coast. *Quart. Jour. Forest.* 14: 176-184. 1920.—A general discussion of the sand dunes of the region and a plan for their reclamation. Afforestation cannot be considered as an actual means of sea-defense but should be a secondary operation following the fixing of the sand by means of the marram grass. Corsican pine at Holkham in Norfolk has proved the best species for planting on open parts exposed to sea breezes. In growth and hardihood, it far surpassed the Scotch and maritime pines.—*C. R. Tillotson.*

1852. GUTHRIE, J. D. The national forest resources of Alaska are for use. *Amer. Forestry* 27: 12-14. 5 fig. 1921.

1853. HARTEL, O. Ist die Wildbachverbauung notwendig? [Is control of torrents necessary?] *Wiener Allg. Forst- u. Jagd-Zeitg.* 38: 171-172. 1920.—This question is treated under two heads: (1) How far is the great expense of torrent control economically justified, and (2) can poverty-stricken Austria afford the luxury of this control? The author shows that reforestation, protection, and careful regulation of the use of the watersheds, where the streams are small, helps greatly in ameliorating conditions in the main channels. Expensive engineering works have in the past been constructed in some places where only full protection of the upper slopes was needed. The work of the forester is inexpensive and can be carried on generally; expensive engineering works can be constructed if needed, following protection of the headwaters. Secondly, the author shows that Austria must control torrents both in view of hydro-electric developments and agriculture in the valleys.—*F. S. Baker.*

1854. HEADLEY, R. Fire protection to save our forests. *Amer. forestry* 26: 710-714. 4 fig. 1920.

1855. HENKEL, J. S. Forestry in Rhodesia. Improvement fellings on the farm. *Rhodesia Agric. Jour.* 18: 76-79. 1921.

1856. HENKEL, J. S. Forestry in Rhodesia. The management of woods. *Rhodesia Agric. Jour.* 17: 406-411. 1920.

1857. HENRY, AUGUSTINE. The artificial production of vigorous trees by hybridisation. *Quart. Jour. Forest.* 14: 253-257. 1920.—First generation hybrids in trees as in other plants are remarkable for their size, rapid growth, early and free flowering, ease with which they can be multiplied, and, in all probability, their comparative immunity to disease. The slow growth of the ordinary species of oak, ash, and walnut, except on the best agricultural soils, renders hopeless all possibility of an adequate financial return. Without vigorous 1st generation hybrids, the most valuable classes of timber can be grown only in limited quantity. There is the possibility of obtaining vigorous hybrids of the valuable species capable of thriving on soils ordinarily inhospitable. The relation of vigor in hybrids to the degree of relationship between the parents is unknown but of practical interest in the selection of parents for crossing experiments. Very little has been done in hybridization of forest trees. KLOTZSCH carried on experiments in 1845, at Berlin, with pine, oak, alder, and elm, and after 8 years the hybrids averaged $\frac{1}{3}$ larger than the parents. BURBANK's work with walnut in California has resulted in progeny of greater vigor. The author has produced a very vigorous hybrid, *Populus generosa*. Experiments carried out at Kew during the war with *Fraxinus excelsior*,

F. americana, *F. pennsylvanica*, and *F. oregona* resulted in progeny in nowise different from the carpellate parent. The author believes the artificial production of hybrid trees should be taken up seriously through the establishment of a research station, either in France or in the U. S. A.—*C. R. Tillotson*.

1858. HOOD, CONSTANCE C., AND MURIEL I. BACON. Forestry in Morocco. Quart. Jour. Forest. 14: 165-169. 1920.—Contrary to a commonly accepted idea, Morocco is not a desert country. The whole forest area may be divided into 3 zones. The 1st comprises the Forest of Marmora of 325,000 acres; it is open and without underwood. The species are cork-oak, Arar (*Thuya quadrivalvia*), and wild pear. The cork-oak makes this forest of especial interest and importance, it being the largest known forest of this species; the trees appear to flourish better here than in any other region, and the bark can be removed every 8 years (as compared with 13 years in the south of France), being then over an inch in thickness.—The 2nd zone covers a very large area, at present practically unsurveyed, extending over the Anti-Atlas regions. The species are cork-oak, maritime pine, cedar, juniper, yew, and maple. Large tracts of *Ilex* yield an excellent timber especially suitable for railroad ties. For the most part, the cedar grows pure and produces magnificent timber. Cedars 300-400 years old are 35-40 m. high and 5-6 m. in girth. These forests represent an enormous reserve awaiting future exploitation.—The 3rd zone is found in the south, in the Mogador-Agadir district, and comprises 1,250,000 acres. The soil is generally poor, varying from almost pure sand in the coast regions to calcareous in the extreme easterly portions. The prevailing species is the Argan (*Argania sideroxyylon*), of peculiar botanical interest because of its very limited distribution. The wood is very hard, heavy (sinks in water), and makes excellent charcoal. The first yields Argan oil, an important article of food in southern Morocco. In this region also juniper and Arar occur. The latter species provided the material for the celebrated Roman tables of "mottled wood;" it is also tapped for resin.—There has been considerable activity in planting trees for ornamental purposes. The trees used chiefly for this purpose are eucalyptus, mulberry, sycamore, Aleppo pine, Bella Ombra, and poplar.—*C. R. Tillotson*.

1859. HRP. Zur Reform der Staatsforstverwaltung in Oesterreich. [Reform of the state forest administration in Austria.] Allg. Forst- u. Jagd-Zeitg. [Wien] 38: 87-88. 1920.—For a long time there has been a movement on foot among Austrian foresters to place technical foresters in the highest administrative offices in place of the jurists, who now occupy such positions. There are a number of indications (spring 1920) that the foresters have at last won their point.—*F. S. Baker*.

1860. KAY, JAMES. Notes on jack pines and Sitka spruce. Trans. Roy. Scottish Arboric. Soc. 34: 149-155. 1920.—Botanical and silvical descriptions of *Pinus divaricata* (*P. banksiana*), *P. contorta*, *P. contorta* var. *murrayana*, and *Picea sitchensis*.—*C. R. Tillotson*.

1861. L., F., UND K. V. Zum Entwurfe eines neuen Forst-Servituten Gesetzes. [Plans for a new forest servitude law.] Allg. Forst- u. Jagd-Zeitg. [Wien] 38: 135-137. 1920.—Two separate articles under one title.—F. L. points out the harm of the present system of servitudes dating from 1853. As originally given out they permitted the use of only a fraction of the total wood product, and much wood was left over in the forest to go to waste. Now, however, they seriously embarrass the proper exploitation of the forests, since all holders of rights take the maximum allowance whether they use it personally or not, selling any surplus. Furthermore, the servitude gives a right to 70 per cent firewood and 30 per cent sawtimber, whereas the forest is actually producing about 70 per cent sawtimber and 30 per cent firewood. The deficiency necessitates the giving of sawtimber for use as firewood. The opinion that the servitudes ought to be changed is general; the holders of rights desire further extension, while foresters and others favor limitation.—K. V. desires a change in the servitudes in the interests of uniformity as they are quite variable in different parts of Austria. He regards them as a part of the rights of the people under a republican form of government, and would have them extended.—*F. S. Baker*.

1862. LAMB, G. N. American grown cork. *Amer. Forestry* 27: 15-16. 5 fig. 1921.

1863. LAPEYRERE, M. E. The Landes of Gascony. *Trans. Roy. Scottish Arboric. Soc.* 34: 155-167. 1920.—A historical review of the development of the Landes as a timber and turpentine producing region.—*C. R. Tillotson.*

1864. LR. Aus ein Zypressenhain in Amerika. [A cypress grove in America.] *Wiener Allg. Forst- u. Jagd-Zeitg.* 38: 270. 2 illus. 1920.—A note on Monterey cypress (*Cupressus macrocarpa*), with a description of the peculiar gnarled growth.—*F. S. Baker.*

1865. M'PHERSON, ALEX. Commercial forestry in the Highlands. *Trans. Roy. Scottish Arboric. Soc.* 34: 178-181. 1920.—Present tax laws make it impracticable to grow mature timber in the Scottish Highlands although timber of a superior quality can be produced there. The growing of pitwood should be the staple form of forestry. Plantations 19 and 27 years old disposed of for this purpose have yielded returns above interest of 16s. 9d., and £3 4s. 5d. per acre respectively. Pitwood on a 19-year rotation is a more profitable investment for land owners than sheep farming.—*C. R. Tillotson.*

1866. MOTTL, KARL. Die forstlichen Verhältnisse im oberen Friaul. [Forestry situation in upper Friuli.] *Wiener Allg. Forst- u. Jagd-Zeitg.* 38: 250-251, 255-257. 1920.—A description of the Aupatal or Val d'Aupa in upper Friuli, from a general and forest standpoint. This valley is in the Dolomite Alps in a region noted for torrents. It has good natural forests, mostly of spruce, but they have been much mismanaged. The article includes a description of the principal timber bodies and general forest conditions. No statistical information is included.—*F. S. Baker.*

1867. PACK, A. N. Pulpwood from British Columbia. *Amer. Forestry* 26: 715-719. 8 fig. 1920.

1868. PESCHAUT, ROMAN. Elektrizität und Forstwirtschaft. [Electricity and forestry.] *Allg. Forst- u. Jagd-Zeitg.* [Wien] 38: 129-130. 1920.—Large power developments are planned on the Danube and other Austrian streams; there is considerable irregularity of flow, however, and dams will be necessary. The present over-cutting on higher watersheds and the unrestricted use of litter is tending to make the run-off still more irregular. The maintenance of forest cover is necessary for the most complete utilization of water for power, as is demanded by the proposed hydro-electric developments in Austria.—*F. S. Baker.*

1869. PETRASCHKE. Die weitere Entwicklung der Kiefern-Hartznutzungstechnik. [Further development of the turpentine technique in the pine.] *Wiener Allg. Forst- u. Jagd-Zeitg.* 38: 279-281, 285-287, 291-292. 1920.—This is a review and compilation of articles by many writers. It covers the anatomical and physiological factors governing resin production and flow, and the different methods that have been devised for tapping the trees and securing the resin, particularly the experimental methods using different forms of chipping and different frequencies.—*F. S. Baker.*

1870. PRINTZ, E. Schwedens Holzhandel und Holzindustrie. [The Swedish lumber industry.] *Wiener Allg. Forst- u. Jagd-Zeitg.* 38: 219-221. 1920.—This is a statistical article based on 2 books: "La Suede, son peuple et son industrie" by G. SUNDBARG, Stockholm, 1900, and "Eine forstliche Studienreise nach Schweden" by GABRIEL JANKA, Vienna, 1914.—*F. S. Baker.*

1871. RAGL, F. X. Streunutzung in bayrischen Staatswald. [Use of litter in Bavarian state forests.] *Allg. Forst- u. Jagd-Zeitg.* [Wien] 38: 89. 1920.—During the war, regulation of the use of litter was relaxed and the annual consumption rose from about 735,000 cubic m. to millions. Many forests are now completely cleared and the demand far exceeds the supply. Reproduction is falling off and production is decreasing. Growth is less a function of stocking than of ground conditions, as shown by 2 similar adjacent areas. In the first the litter is

used and in the second it is left. Volume growth on the 2 areas is as 1 is to 2.5, the quality coefficient as 1 is to 1.5. Litter is deficient in potash and phosphorus and makes a poor fertilizer for agriculture; its highest value is realized in the forest.—*F. S. Baker.*

1872. RECORD, S. J. Scented woods. *Amer. Forestry* 26: 665-672. 20 fig. 1920.—A popular description of various odoriferous woods.—*Chas. H. Otis.*

1873. REISNER, J. H. Progress of forestry in China. *Amer. Forestry* 26: 655-658. 5 fig. 1920.

1874. RETTMAYER. Zum Windmantel 5 des Forstgesetzes. [Windbelts, section 5 of the forest laws.] *Wiener Allg. Forst- u. Jagd-Zeitg.* 38: 249-250. 1920.—A discussion of the meaning of the law and its practical application under different conditions.—*F. S. Baker.*

1875. ROWE, M. H. Mixed woods. *Quart. Jour. Forest.* 14: 171-176. 1920.—A silvicultural discussion of the advantages and disadvantages of mixed woods with suggestions as to desirable and undesirable species in mixture. The point is made that the safest and at the same time most easily managed system of mixing is by groups which are planted pure. Groups of shade-bearing species should be at least $\frac{1}{2}$ acre in size, more if possible; groups of light demanders should never exceed $\frac{1}{2}$ acre in extent, preferably $\frac{1}{4}$ acre. There is a good reason for small groups of light-demanding trees. After the thicket stage is past, the characteristic opening out inevitably ensues, thus permitting soil deterioration.—*C. R. Tillotson.*

1876. SIECKE, E. O., AND L. WYMAN. Forestry questions and answers. *Texas Agric. Exp. Sta. Forest Bull.* 12. 15p. 1920.—This bulletin consists of general questions and answers as to present areas and conditions of Texas forests and other forestry problems of an elementary nature. One map shows the forested areas and type of forest in each; another divides the state into 5 tree-planting districts and lists trees suitable for each.—*L. Pace.*

1877. SIM, T. R. Pine tree culture in South Africa. A summary of the results of practical experiences. *South African Jour. Indust.* 4: 65-75. 1921.

1878. SIM, T. R. Timber trees for commercial culture. Species that have been tried in South Africa. *South African Jour. Indust.* 3: 1030-1039. 1920.

1879. SIM, T. R. Timber trees for South Africa. Eucalypts and others considered in detail. *South African Jour. Indust.* 3: 1155-1172. 1920.

1880. SISSON, G. W., JR. The pulp and paper industry. *Amer. Forestry* 26: 687-688. 1920.—[Extracts from an address at the New England Forestry Conference, Aug., 1920.]

1881. SLAVIK, VICTOR. Die Nonne. [The nun moth (*Liparis monacha*).] *Allg. Forst- u. Jagd-Zeitg.* [Wien] 38: 96-99, 110-111. 1920.—A full discussion of methods in vogue for discovering and destroying the nun moth, including the collection of caterpillars on standing and felled trees, destruction of eggs and general management of affected stands. Thinnings between April and August should not be carried on in affected forests. Fifteen points are enumerated in conclusion bearing on control of the nun, ranging from direct destruction to indirect educational means.—*F. S. Baker.*

1882. SMYTHIES, E. A. Afforestation of ravine lands in the Etawah District, United Provinces. *Indian Forest Rec.* 7^s: 1-32. Pl. 1-34. 1920.—Deforestation and over-grazing are responsible for severe ravine erosion in all stream beds in the Gangetic plain where the population is dense. To check the erosion, it is proposed to reduce the velocity of the water by means of small dams and to improve the soil cover at the head of ravines. In the filled-in basins behind the dams trees are planted which make an excellent growth. On steep slopes, small contour terraces are made to prevent soil wash, to collect and store water, and to furnish places for seed and tree planting. The work is to be carried on as a measure of famine relief; and as labor at that time is cheap and plentiful, the work can be done at small cost, while the government receives a benefit from the famine relief.—*E. N. Munns.*

1883. STEWART, HUGH SHAW. Observations on the planting of the quicker growing conifers. Trans. Roy. Scottish Arboric. Soc. 34: 141-145. 1920.—Spacing even as close as 3 feet in the case of Douglas fir and Japanese larch does not prevent, and only partially restrains, branch growth. If clean boles are required, hand pruning close to the stem must be resorted to. Such spacing, moreover, results in the production of many suppressed boles of little value which interfere with the root development of the more vigorous, dominant neighbors. Spacings of $5\frac{1}{2}$, 6, and 7 feet are advocated respectively for Sitka spruce, Japanese larch, and Douglas fir.—*C. R. Tillotson*.

1884. STUART, J. S. NIBLOCK. The effect of storms on certain forests in the Tsolo district, Cape Province. Jour. Dept. Agric. Union of South Africa 1: 750-754. 3 pl. 1920.

1885. TROMP, F. J. Essential oils, with special reference to those obtained from the Eucalypts. South African Jour. Indust. 4: 85-89. 1921.

1886. VENDELMANN, HENRY. Forestry by precultures. Quart. Jour. Forest. 14: 185-190. 1920.—Forestry by precultures has been attended with such striking success that it is being widely adopted. It consists in improving the soil to such an extent that it becomes suited to the varieties of trees which have been selected for planting. Improvement of the soil is brought about by deep surface plowing, subsoil plowing where there is hardpan, the adding of commercial fertilizers, and the growing of green manures. This is followed by an agricultural crop, against which the cost of soil improvement can be charged. Some trees can be grown by sowing the seed with the grain crop. In the case of others, 1 or 2-year seedlings are planted following the removal of the grain, the land being in such condition that planting can be carried on very rapidly. In December (shortest days of the year) an average of 8,000-9,000 1-year firs were planted in a day by 1 slitter and 2 boy planters. On a particular day, 1 slitter and 3 boy planters put in 18,000 plants.—*C. R. Tillotson*.

1887. WATT, A. S. The biological basis of forestry. Trans. Roy. Scottish Arboric. Soc. 34: 210-216. 1920.—The author emphasizes the need of an adequate understanding of the biological factors entering into the growth of trees in stands in order to place forestry upon a scientific as well as a sound economic basis and to avoid the evil results of the application of imperfect knowledge.—*C. R. Tillotson*.

1888. WEISS, F. E. Fibre yielding plants and their economic importance. Ann. Rept. and Trans. Manchester Microsc. Soc. 1919: 25-31. 1920.—Presidential address delivered February 13, 1919. A brief enumeration and description of plant tissues and parts used in various portions of the world in the making of paper, cordage, and textiles.—*C. E. Allen*.

GENETICS

G. H. SHULL, *Editor*

J. P. KELLY, *Assistant Editor*

(See also in this issue Entries 1589, 1590, 1601, 1608, 1615, 1774, 1812, 1837, 1857, 1955, 1962, 1967, 1972, 1974, 1975, 1990, 2012, 2091, 2104, 2194, 2263)

1889. ANONYMOUS. [Rev. of: ADAMI, J. G. Medical contributions to the study of evolution. xviii + 372 p., 7 pl., 18 fig. Duckworth & Co.: London, 1918.] Sci. Prog. [London] 13: 679-681. 1919.

1890. ANONYMOUS. Biology of endogamy and exogamy. [Rev. of: EAST, E. M., AND D. F. JONES. Inbreeding and outbreeding: their genetic and sociological significance. 285 p. J. B. Lippincott Co.: Philadelphia and London, 1919.] Nature 106: 335-336. 1920.—See Bot. Absts. 4, Entry 571.

1891. ANONYMOUS. South African's views of citrus methods used in California. [Rev. of and extracts from: FITZPATRICK, PERCY. Citrus growing in California. 32 p. National Bank of South Africa, Pretoria, 1920 (see Bot. Absts. 8, Entry 1910).] California Citrograph 6: 46, 62-64, 78, 99. 2 fig. Dec., 1920, and Jan., 1921.

1892. ANONYMOUS. [Rev. of: GAGER, C. S. Heredity and evolution in plants. xv + 265 p., 113 illus. P. Blakiston's Son & Co.: Philadelphia, 1920 (see Bot. Absts. 6, Entry 1672; 7, Entry 1610).] Sci. Prog. [London] 15: 498. 1921.—See also Bot. Absts. 8, Entry 1079.

1893. ALDER, B. How to cull a flock of hens. Utah Agric. Exp. Sta. Circ. 42. 3-8, 5 fig. 1920.—Author gives directions for distinguishing between laying and non-laying hens on the basis of the bodily changes which accompany the transition from one condition to the other.—William A. Lippincott.

1894. ANTHONY, R. Le pseudo-hermaphroditisme tubaire chez les Cétacés mâles. [Pseudo-hermaphroditism in the male Cetaceans.] Compt. Rend. Acad. Sci. Paris 171: 1398-1399. 1920.—Well developed male utricles and Muellerian ducts are regularly or occasionally found in male Cetaceans. Author regards this condition as primitive.—A. Franklin Shull.

1895. BECKER, J. Xenien zwischen Melonen und Gurken. [Xenia in muskmelons and cucumbers.] Zeitschr. Pflanzenzücht. 7: 362-364. Nov., 1920.—A testing out of the belief that cross-pollination of melons and cucumbers leads to xenia as evidenced by undesirable flavors. One cucumber resulted from 10 guarded hybridizations with melon pollen; its seeds were undeveloped but its flavor was not unusual.—J. P. Kelly.

1896. BENJAMIN, E. W. A study of selections for the size, shape, and color of hens' eggs. Cornell Univ. Agric. Exp. Sta. Mem. 31. 189-312, 1 pl., 37 fig. 1920.—This report covers the work of 8 years in which the author kept under minute observation and careful control large flocks of single-comb white Leghorn hens from the high-producing, trap-nested stock of the Cornell strain. Many correlation tables are presented.—The results show that a great deal of variation exists in the size, shape, and color of eggs from a single hen. This variation does not depend upon difference between the parents, but it is to some extent inherited. Color tends to be more irregular than the other characters. Size, shape, and color are inherited directly and equally from both parents. Small size and length of egg are dominant while no dominance occurs for color. A definite correlation exists between the characters of the egg set and those of the eggs of the hen it produces. This correlation, however, is not as great as the correlation between the means of the eggs produced by parents and offspring. No correlation was found between size, shape, and color, or any two of these characters. The size of eggs increases rapidly during the early part of the pullet year, while pigment continues to become darker until the end of the 2nd laying year. The offspring from pullets' eggs are not more variable than those from hens' eggs.—A positive correlation was found between the size of the egg and the weight and vigor of the bird produced. Size, shape, and color have no effect on the ability of the egg to hatch.—H. G. May.

1897. BLARINGHEM, L. Anomalies florales observées sur la descendance de l'hybride *Linaria vulgaris* × *L. striata*. [Floral anomalies observed in the descendants of the hybrid *Linaria vulgaris* × *L. striata*.] Compt. Rend. Acad. Sci. Paris 169: 1103-1105. 1919.—The F_1 of the cross of *Linaria vulgaris* × *L. striata* was found to be partially sterile, and only 17 F_2 plants were obtained. There was some sterility in the F_2 and several cases of abnormal floral development were observed.—Karl Sax.

1898. BRIDGES, CALVIN B. The mutant crossveinless in *Drosophila melanogaster*. Proc. Nation. Acad. Sci. 6: 660-663. 1920.—Author describes "crossveinless," a sex-linked mutant character in *Drosophila melanogaster*, and points out its usefulness in genetical experiments and its apparent homology with "crossveinless" in *D. virilis*.—C. W. Metz.

1899. BRYAN, W. E., AND C. O. BOND. Plant breeding. Arizona Agric. Exp. Sta. Rept. 29: 314-321. 1918.—Breeding results obtained in an effort to produce wheat of high yield with high gluten content of superior quality. For irrigated valleys of Arizona earliness is of prime importance in establishing such a wheat. Where late spring irrigation is necessary for late varieties quantity and quality of gluten are reduced.—Brief reports of investigations with beans, alfalfas, and sorghums are also made.—*J. P. Shelton*.

1900. BURGESS, C. H. Breeding for egg production. Michigan Agric. Exp. Sta. Quart. Bull. 2: 190-192. 1 fig. 1920.—Data are presented which indicate "that higher egg-producing power" may be introduced into a flock of barred Plymouth Rocks or single-comb white Leghorns through males from high-producing dams.—*William A. Lippincott*.

1901. BUSH-BROWN, H. K. Heredity in horses. Jour. Heredity 11: 215-227. Fig. 16-27. 1920.—Distinction is made between skeleton of the Arab horse, which has 5 lumbar vertebrae, and all other horses, which have six. This difference is given as one of the outstanding causes of the greater endurance of the former. The limited data available indicate the short back to be recessive to the long back. A jenny bred to a stallion produced a hinney which inherited the 5 lumbar vertebrae of the dam. Likewise, a short-back mare bred to a stallion with 24 vertebrae produced a short-back offspring. The 3 instances of this combination led the author to suggest the dominance of the dam over the anatomy of the foal. The strength of the Arab horse as a weight-carrier is attributed to the shorter distance between the supports. In the army tests of 1920 the endurance of the Arab horses and their derivatives was superior to that of others.—*M. J. Dorsey*.

1902. CHERRY, T. The evolution of man and his mind. Sci. Prog. [London] 15: 74-100. 1920.—A speculation in regard to the origin of man. "The recent advances in knowledge have introduced new difficulties both on the side of structure and of function, and have made untenable the current theory of the comparatively recent separation of the human and the ape stocks." These difficulties are discussed under 2 examples of structure—(a) the premaxilla, present in the apes and absent in man, and (b) the foot; and 2 examples of function—(a) instinct, practically lacking in man, and (b) the growth and metabolism of the body, based on RUBNER's work. Other difficulties are mentioned and the importance of DOLLO's law of the "irreversibility of the course of evolution" is emphasized.—The writer then undertakes to reconstruct a theory of human phylogeny. He starts with "a generalized primate of the *Anaptomorphus* type . . . about as large as a rat," inhabiting trees of the Lower Eocene and feeding on birds chiefly by night. Probably during the Eocene "the lemurs, New World monkeys, and Old World monkeys separated from one another" and in the Upper Eocene "the branch of the Old World monkeys which gave rise to the apes and man came to the ground." The common ancestor acquired a fair approximation to a bipedal gait and the diet consisted largely of lizards, grubs, and scorpions as evidenced by the digestive organs. The changes that now take place leading toward man require 2 conditions of environment, namely, abundance of easily obtained nitrogenous food, and safety. These conditions are most fully met on the seashore. "It is therefore in no way improbable that one family of the Late Eocene primates may have chanced on some part of the beach where shellfish are plentiful and there begun a course of evolution different from all their former associates in the trees." Ancestors of the apes from time to time, but at a very early period, left the seaside and returned to the trees; first, the early gibbons, next the orang, and finally the common ancestor of the gorilla and chimpanzee, leaving the human stock to work out its evolution under seaside conditions. The writer then develops his theory of the evolution of man in adaptation to a seashore environment, including small teeth, slow movements, lack of organs for attack or defence, naked skin, monthly cycle in woman, free shoulder-joint, and development of the brain.—*Howard J. Banker*.

1903. COLLINS, G. N. Dominance and the vigor of first generation hybrids. Amer. Nat. 55: 116-133. 1 fig. Mar.-Apr., 1921.—Author believes that the explanation of heterosis should place emphasis on suppression of deleterious recessive characters rather than on accumulation of

dominant growth factors. Evolutionary progress depends on advantageous variations, but these are rare and their effect negligible in explaining heterosis. Practically all known maize variations are detrimental, and the vast majority of them recessive. (Deleterious dominant mutations are quickly eliminated.) Furthermore, present knowledge indicates that the rôle of linkage must be of minor importance in maize; and the question is raised whether the assumption of linkage is necessary to explain heterosis.—Difficulty of securing uniform strains with the vigor of F_1 has been assumed rather than demonstrated, since selection following hybridization has never been continued long enough to approximate such homozygosity. Author considers certain data of EMERSON and EAST (1913) together with some of his own on height. "In every case where a progeny was grown from a plant near the upper limit of the range of the F_2 its mean exceeded that of the F_1 ." Some of the data on length and diameter of ear and length of internode also suggest isolation of strains with vigor of F_1 . Tables are presented showing extreme practical difficulty (due to large numbers which must be grown) of obtaining homozygous F_2 individuals with vigor of F_1 (even without assuming linkage). To obtain 1 individual 70 per cent homozygous, assuming 15 effective character pairs, would require growing 6000 F_2 individuals. On question of skew distribution of F_2 vigor due to dominance (without linkage), author presents significant table with accompanying graph. With 20 character pairs involved, populations of 500 individuals would conform with normal frequency curve; skewness would be detectable only in enormous F_2 populations. Assumption that relative effect of a given growth factor depends on size of organism also assists in veiling skewness. Author concludes that heterosis is due to suppression of deleterious recessive characters, and can be explained without assuming linkage.—*Merle C. Coulter*.

1904. CUTLER, D. WARD. The cytological problems arising from the study of artificial parthenogenesis. *Sci. Prog.* [London] 15: 435-444. 1 fig. 1921.—Review of some of the evidence for (1) individuality of chromosomes, and (2) relation of chromosomes to sex, preparatory to discussion of artificial parthenogenesis in later article.—*A. Franklin Shull*.

1905. DETJEN, L. R. *Peloria* in *Viola primulaefolia* Linn. *Torrey* 20: 107-116. 10 fig. 1920.—A strain of violets bearing peloric and partially peloric flowers was propagated from a single plant found in nature. The completely peloric flowers are symmetrical, having 4 sepals, 4 petals, 4 stamens, and a pistil of 4 carpels.—*E. G. Anderson*.

1906. DETLEFSEN, J. A., AND W. J. CARMICHAEL. Inheritance of syndactylism, black, and dilution in swine. *Jour. Agric. Res.* 20: 595-604. 1 pl. 1921.—A registered mule-foot boar (syndactyl, black) crossed with registered Duroc-Jersey sows (cloven-foot, red) produced only black, mule-foot pigs. The results of a back-cross with a Duroc-Jersey boar indicated independent segregation of a unit factor for mule-foot dominant over cloven-foot and a unit factor for black dominant over red. The red cloven-foot segregates bred true in F_3 and F_4 . The "red" segregates varied between intense red and cream. The so-called creams were absolutely white at birth, merely developing traces of yellow medullary pigment later. The data were insufficient to determine the mode of inheritance of the grades of intensity but confirmed earlier work indicating that white in swine often represents extreme dilution of red due to factors which dilute red but which do not dilute black to a perceptible extent.—*Sewall Wright*.

1907. DETLEFSEN, J. A., AND E. ROBERTS. Studies on crossing over. I. The effect of selection on cross-over values. *Jour. Exp. Zool.* 32: 333-354. 2 fig. Feb. 20, 1921.—The authors selected for high and low crossover values in *Drosophila melanogaster*. They used the characters white and miniature, the genes of which lie in the X chromosome. In order to save work and time single pair matings were made only in alternate generations. The other generations were mass cultures. In the A series the first 5 generations of selection made no change. There was considerable fluctuation. After the 5th generation progress was rapid. The normal percentage of crossing over between white and miniature is 33. In F_2 the authors had reduced it to 16.49. From F_{10} to F_{13} the percentage was reduced to less than 1. The last generations were bred under abnormal conditions and the numbers were few. Series A,

was started from the 7th generation of series A and continued to F_{15} . The average percentage for these generations was 0.64. Here again the numbers were not large. Series B was also selected for low crossover values. For the first few generations there was no effect. In F_7 a pair gave 14.34 per cent. From F_8 to F_{14} the percentage fluctuated between 10 and 23. From F_{15} to F_{23} it varied around 10 and from F_{23} to F_{29} around 6. After F_{23} the line bred true for low crossover values in mass cultures for 23 generations.—Series C was selected for high crossover values. It was carried for 8 generations only and no progress was made. In F_7 9 pairs gave low crossover values, less than 6 per cent. The authors interpret this to mean that double crossing over had been induced, resulting in a decreased percentage. After making several suggestions the authors concluded that "crossing over in the various regions of the sex chromosome is probably controlled by multiple incompletely dominant factors."—*F. Payne.*

1908. EAST, E. M., AND D. F. JONES. Genetic studies on the protein content in maize. *Genetics* 5: 543–610. 8 fig. Nov., 1920.—Following a discussion of breeding plants for altered chemical composition, the work of the Illinois Agricultural Experiment Station on high and low protein content in maize is reviewed in detail. The conclusion is reached that the individual seed rather than the entire ear should be used as the basis of selection. In a comparison between guarded self-pollinated ears and open or wind-pollinated ears, it was found in the majority of cases that the seeds of the self-pollinated ear had the highest percentage of protein. Pursuing the problem from this point, a test was made to determine the immediate effect of pollination on the composition of the seed. It was found that in each of 32 comparisons the crossed seeds weighed more than the selfed seeds, supporting previous results. With respect to the protein content the effect of cross-pollination is slight, 7 of the 32 cases showing an increased percentage of protein but on the average a slight decrease. This decrease is not accounted for entirely by the increase in weight of seed since the total amount of protein also is increased.—When a mixture of pollen from high- and low-protein plants was applied to plants of a high-protein strain a significantly higher percentage of protein was found where both parents were high in protein. The protein content of different self-pollinated ears borne on the same plant was tested and little difference found.—In a chemical analysis of 2nd generation seeds borne on 1st generation plants it was found that while the percentage of protein was reduced the total amount per acre was increased due to the increase in yield.—In conclusion the authors state that the protein content of the seeds is determined largely by heredity although variations as high as 40 per cent may be caused by environmental fluctuations. The number of differentiating hereditary factors involved cannot be determined nor their method of inheritance described, but they are believed to be in excess of 5 or 6 with the possibility of a smaller number of main factors and numerous subsidiary ones.—Twenty per cent of the protein of the seed is in the embryo and 80 per cent in the endosperm. The notable variations appear in the endosperm. Heterosis increases the size of the seeds with a consequent reduction in the per cent of protein. This is especially noticeable in seeds borne by hybrid plants. F_1 seeds when corrected for the influence of heterosis have a protein content intermediate between those of the parents, with perhaps a tendency to be closer to that of the high-protein parent.—The factors borne by the male gamete are practically without immediate influence on the protein content leading to the belief that the constitution of the mother plant is the major determining factor.—If a high-protein strain is found to be desirable it can be obtained more rapidly by the isolation and recombination of homozygous high-protein strains than by the method of mass selection followed in the classical experiment at Illinois.—*J. H. Kempton.*

1909. FIRBAS, HEINRICH. Über die Erzeugung von Weizen-Roggenbastardierungen. [The production of wheat-rye hybrids.] *Zeitschr. Pflanzenzücht.* 7:249–282. Nov., 1920.—Author studied conditions affecting set of seed when wheat was crossed with rye. Flowers were pollinated just after blooming and also at later dates, better results being obtained with the earlier applications. Pollinations were made in heated and unheated rooms, under dry and moist conditions, and at different times of the day; it is concluded that such external condi-

tions had little or no influence on the setting of seed. Old pollen gave apparently as good results as fresh, other conditions being equal.—Whether glass tubes or paper were used in covering the flowers did not affect the results. The factor that played the greatest part in securing a good set of seed was the difference between wheat races and between individuals within these races. The influence of the individuals in obtaining many seeds is not the same for all races. With some races the individuality is of greatest importance. The influence of the individual is greater with wild races than with cultivated ones. Individuality in the case of the male plants is not marked.—Reciprocal crosses using rye as the female parent have not yet been obtained.—Certain wheat races, such as Bokara, give more seed when pollinated with rye.—*H. H. Love.*

1910. FITZPATRICK, PERCY. Citrus growing in California. 32 p. National Bank of South Africa, Pretoria, [1920.]—A popular discussion is included of "bud variation" in citrus fruits, with especial consideration of SHAMEL's work and of the resulting practice of propagating from "performance-record" trees. WEBBER's study of variation in seedling stocks is also discussed.—*Howard B. Frost.*

1911. FRANCE, L. V. The problem of controlled fertilization of queen bees. Jour. Econ. Entomol. 14: 105-110. Feb., 1921.—Author emphasizes the importance to commercial beekeepers of controlled matings and cites a number of experiments recorded in the beekeeping literature to this end. No new trials are recorded.—*E. F. Phillips.*

1912. GALANT, S. Über die Entstehung von Variationen bei *Anemone hepatica*. [On the origin of variations in *Anemone hepatica*.] Biol. Centralbl. 39: 529-535. 1919.—Observations were made on 1729 flowers of *A. hepatica* [*Hepatica triloba*] gathered on the Belpberg. Modal number for colored perianth leaves (referred to as petals) was 6 and was shown in 1180 of the 1729 flowers; range was from 7 to 11, inclusive. Mode for sepal-like leaves was 3 exhibited by 1665 flowers, and range was from 2 to 5, inclusive. No calculated constants are given. Author dissents from BOHN's hypothesis that variations in general indicate disease and suggests that increase in number of petals is due to metamorphosis of stamens or sepals. He comments also on color variation, noting especially that 2 white flowers occurred in a total of 1729, and quotes CHODAT to the effect that whiteness maintains itself in cultures.—*James P. Kelly.*

1913. GILLIES, C. D. Variation of sepals of *Bruguiera Rheedii* Blume. Proc. Roy. Soc. Queensland 30: 95-96. 1918.—The calyx of the mangrove is a conspicuous red structure commonly found in the tidal debris along the ocean shores at certain points. In 118 calyces collected the number of sepals varied from 9 to 13, the frequencies being as follows:

No. of sepals.....	9	10	11	12	13
Frequency.....	13	47	38	17	3

From these data the following constants were calculated: Mean, $10.57 \pm .002$; mode, 10.471; standard deviation $3 \pm .001$; coefficient of variability, $2.84 \pm .001$. The frequency polygon is unimodal; the theoretical mode is 10.471; actual mode, 10. Coefficient of variability, 2.84, is a low value.—*E. B. Babcock.*

1914. GOODALE, H. D., RUBY SANBRON, AND DONALD WHITE. Broodiness in domestic fowl. Data concerning its inheritance in the Rhode Island Red breed. Massachusetts Agric. Exp. Sta. Bull. 199. 93-116, 4 fig. 1920.—A broody bird in the Rhode Island Red breed is recognized by its tendency to remain on nest when not laying, the ruffling of feathers and clucking. Confinement for 3-6 days with food breaks up broodiness. Hens are grouped as broody and non-broody. Broody hens may have a broody period early in 1st laying year or later. Broody periods usually recur at short intervals after the 1st period. Non-broody hens sometimes show broodiness in succeeding years.—The data confirm the theory that broodiness is due to 2 dominants; but some evidence also exists that a dominant for non-broodiness is present in some cases. Selection quickly changed a very broody flock to one with few broody hens. Matings between non-broody stock sometimes give broody offspring.—*H. G. May.*

1915. GUILLEMINOT, H. Le deuxième postulat du calcul des probabilités et la loi d'option dans l'évolution de la matière vivante. [The second postulate of the calculus of probabilities and the law of option in the evolution of living matter.] *Compt. Rend. Acad. Sci. Paris* 169: 993-995. 1919.—Organic phenomena differ from inorganic in that the probability of a given reaction of an organism is affected by its prior reactions.—*John Rice Miner*.

1916. HAECKER, V. Über weitere Zusammenhänge auf dem Gebiete der Mendelforschung. [On further correlations in the field of Mendelian investigation.] *Pflügers Arch. Ges. Physiol.* 181: 149-169. 1920.—A theoretical discussion of relations between mode of development of characters and mode of inheritance. Author holds that characters which are caused in a simple way and undergo autonomic development from the first appearance of the "anlage" are apt to show clear-cut segregation, while characters which are caused by a complex of causes and with correlative development tend to show more or less departure from the Mendelian scheme, as irregular dominance, unusual ratios caused by impure segregation, modifiability by selection, and, if pathological, correlation or alternation with other anomalies. A given character of the 1st class is likely to appear in many more or less closely related species, while characters of the 2nd class tend to be limited to one species. Those of the 1st class arise by mutation, those of the 2nd by gradual change; those of the 1st class are degenerative or of no biologic significance, while the 2nd class includes the adaptive and other species-forming changes.—*Sewall Wright*.

1917. HARLAND, S. C. Inheritance of certain characters in the cowpea (*Vigna sinensis*). II. *Jour. Genetics* 10: 193-205. 1920.—Experimental genetic data on 4 series of characters in cowpea—anthocyanin in stem and leaf stalk, seed-coat pattern color, pod color, and flower color. Results on F_1 , F_2 , and F_3 generations are given. Anthocyanin coloration in stem and leaf stalk is due to factor X , dominant to its absence. Seed-coat pattern colors—black, brown, buff, maroon, red, and white—result from various combinations of 4 factors, B (black), N (buff), M (maroon), and R (red), and their absences. New-Era pattern of seed coat is due to factor E , which expresses itself only in the presence of R . The albino type, Para, carries 2 seed-coat pattern factors, D and H (either H_1 or H_2), which produce no visible expression except in the presence of R . Purple-pod types differ from green-pod types by 1 main factor, P , although F_2 ratio suggests that more than 1 pair of factors may be involved. Purple pod is partially dominant in F_1 . Pigment factors B (black) and E (New Era) show repulsion on a basis probably higher than 1:15. Factor B also shows repulsion with factor P (purple pod), probably on a basis higher than 1:7. Tinged flower color is due to factor G , dominant to its absence but recessive to D , the factor for dark flower color.—*Orland E. White*.

1918. HARLAND, S. C. Inheritance in *Ricinus communis* L. Part 1. *Jour. Genetics* 10: 207-218. 1920.—Experimental results involved data on 3 sets of characters, as follows: Presence and absence of a waxy bloom on stems, petioles and capsules; presence and absence of spines on capsules; and stem colors of 4 kinds. Previous investigations are reviewed. F_1 , F_2 , and F_3 results are tabulated. Presence of bloom (B) is partially dominant to its absence (b). Spiny capsule (S) is partially dominant to its absence, smooth capsule (s). Two pairs of factors are concerned in crosses involving stem color, as green \times mahogany gave in F_1 , rose, which in F_2 gave approximately 9 rose: 3 mahogany: 3 green: 1 tinged. The results are interpreted as due to combinations of 2 pairs of factors—the presence and absence of M (mahogany) and the presence and absence of G (green). The F_2 ratio would be 9 MG : 3 Mg : 3 mG : 1 mg . Experiments so far show that S and M , S and B , M and G , and perhaps G and B are not linked. Factors M and B show repulsion in cross $Mb \times mB$.—*Orland E. White*.

1919. HARTLEY, C. P., AND H. S. GARRISON. Reproducing power of well-filled vs. poorly filled ears of maize. *Amer. Nat.* 55: 184-187. 1 fig. 1921.—Occasionally poorly fertilized ears of maize are found in which the failure to develop seed normally is due to accidental causes. An effort was made to determine whether the yielding power of such ears was as great as that of ears normally fertilized. Poorly fertilized ears were produced artificially by 2 methods,

(1) bagging silks an inch long after they had been exposed to pollen, and (2) exposing previously bagged silks for about half an hour and then rebagging. In neither case was the source of the pollen controlled. The ears of the 1st lot had seeds arranged compactly but confined to the butts, while those of the 2nd lot had seeds scattered throughout. Both lots were compared with normally fertilized ears of the same strains but no significant differences in yield were obtained.—*J. H. Kempton.*

1920. HONING, J. A. Selectie-Proeven met Deli-Tabak IV. [Selection experiments with Deli tobacco IV.] Mededeel. Deli-Proefsta. Medan [Sumatra] II. 10: 43-59. 1920.—In the 1918 large-scale tests, light (colored) line No. 1 produced longer, broader leaves lighter in color, with less of the fallow-colored and checkered or dapple grades, as compared with the control tobacco, the results thus agreeing with those obtained in 1917 and 1918. This line is especially valuable on the higher-lying estates which tend to produce relatively dark tobacco. Fallow-colored line 3 yielded a distinct fallow shade, running through all the color grades. The percentage of checkered leaf was smaller than in the control but the leaf was somewhat shorter and a little dryer in character. Two additional lines gave good results while another was not a success. A new selection grown on 16 estates did not equal some of the older strains.—*W. W. Garner.*

1921. HUMPHREY, S. H. The menace of the half-man. Jour. Heredity 11: 228-232. 1920.—A general discussion of the rate of reproduction in the "morons" or "borderliners," so-called poorer stocks, and best stock, in its bearing upon the national life and society. The influence of the reproduction rate of the poorer stocks is traced in the school, in charity, and in industry. Emphasis is placed upon the futility of attacking the problem through an improved environment when heredity is at its base.—*M. J. Dorsey.*

1922. JOHNSON, E. C. Twenty-ninth annual report. Washington [State] Agric. Exp. Sta. Bull. 155. 57 p. 1920.—Brief summary is made of inheritance, in wheat crosses, of resistance to smut. In crosses between winter and spring wheats the F_1 ripened late. In F_2 , spring, F_1 , and winter type appeared in a 1:2:1 ratio. Minor factors were also involved.—Early dropping of apple fruit was found to be correlated with failure to set sufficient seeds per fruit. As much as 68 per cent of dropped fruit contained no normal seed.—Plans for Mendelian studies with blackberry and raspberry hybrids are outlined. [See also Bot. Absts. 7, Entry 1554.].—*H. K. Hayes.*

1923. KEMPTON, J. H. A brachytic variation in maize. U. S. Dept. Agric. Bull. 925. 28 p., 19 pl., 8 fig. 1921.—A new dwarf type of maize, "brachytic," is described and its inheritance discussed. This type is the result of a shortening of the internodes without corresponding reduction in their number or in the number and size of other organs. It was discovered in a 2nd hybrid generation of a cross between Algerian pop-corn and Chinese waxy-endosperm corn, the inference being that it had been carried by the Chinese parent as a recessive, heritable character.—When self-pollinated, the brachytic type produced nothing but brachytic plants. When crossed with normal-type plants, the F_1 proved to be tall and in F_2 the brachytic character segregated in the simple monohybrid fashion. The F_2 brachytic segregates, from a Boone County White-brachytic cross, showed no increase in variability as regards height of plants compared with ordinary brachytic plants. The length of ear, however, of some of these dwarf segregates appeared to be increased, showing that the dwarf type can be maintained and the yield increased somewhat by such crossing. This is an important consideration if the brachytic type is ever to be used commercially (a possibility that the author suggests) since its present yield is relatively low. For dry land and irrigated regions, the brachytic type of structure might prove to be well adapted.—Two teratological forms of maize are also described and a preliminary note concerning their heritability is given. In one of these, designated "adherent," the leaves of the seedling, or even of mature plant, do not unroll normally. The growing culm is unable to break through these leaves and is forced into many contortions in attempting to elongate. This form appears to be recessive in inheritance.—Another abnormality described is one in which the ears end in staminate

spikes. The inheritance of this type is not completely solved as yet. From the appearance and development of ears ending in staminate spikes and of ears borne as basal branches of the terminal inflorescence (noted in a Hopi-brachytic cross), the author suggests "that the ear of maize may have developed from the basal branches of the terminal panicle rather than from the central spike of the terminal inflorescence of a lateral branch of the main culm."—Many good illustrations are given of the types of maize under discussion.—*E. W. Lindstrom.*

1924. KEMPTON, J. H. Linkage between brachytic culms and pericarp and cob color in maize. Jour. Washington [D.C.] Acad. Sci. 11: 13-20. 1920.—Author summarizes genetic linkages that have been reported for maize and describes a new case of linkage. Brachytic (*br*) maize, which is a dwarf type recessive to normal stature, is found to be linked with pericarp and cob color. Three crosses involving the normal-brachytic and colored-colorless pericarp and cob factors give fairly large F_2 distributions showing linkage relations that varied from 35 to 38 per cent crossing over.—Data are presented from these F_2 families that indicate independent inheritance between brachytic culm and liguleless leaf as well as between cob color and liguleless leaf.—*E. W. Lindstrom.*

1925. KOTTUR, G. L. "Kumpta" cotton and its improvement. Mem. Dept. Agric. India Bot. Ser. 10: 221-272. Pl. 1-7. 1920.—"Kumpta" is the trade name of a type of *Gossypium herbaceum* extensively grown in India. Author demonstrated that the type comprises several strains differing in number of vegetative branches, size and shape of leaves, length of bracts and petals, size and shape of bolls, weight of seed, and length of fiber. A strain developed by selection and decidedly superior to the average of the type in habit of growth, earliness, productivity, and abundance and length of fiber is described.—*T. H. Kearney.*

1926. LAUGHLIN, HARRY H. Calculating ancestral influence in man; a mathematical measure of the facts of bisexual heredity. Genetics 5: 435-458. 2 pl., 1 fig. Sept., 1920.—Twenty-five formulae governing ancestral inheritance in general are presented, based on: (1) Bisexual reproduction; (2) heterozygosis for sex factor in one sex; and (3) the number of pairs of chromosomes. Cognizance is taken of the necessity for increased accuracy by means of future inclusion of provisions for sex-linked traits, relative weighting of chromosome groups, maternal or paternal source of chromosome, dominance or recessiveness of gene, and relative frequency of mutation, crossing-over, non-disjunction, and other special chromosome phenomena; but these are not considered in the formulae developed, since they would operate only as special modifications of the general case. Figure 1 presents a clever mechanism for demonstrating the segregation and recombination of chromosomes from ancestors to descendants, with specifications for its construction. Plate 1 diagrams ancestral inheritance in the human male, based on 12 pairs of chromosomes, showing the "X-trails" and "Y trails" of descent for the X and Y chromosomes, and calculates the average, range and chance of contribution of chromosomes to the F_1 zygote in P_2 , P_3 , and P , while plate 2 presents the same data for the human female, with suitable changes for sex. Similar constants for P_4 and P_5 are included in notes accompanying the plates.—*Edward N. Wentworth.*

1927. LINEBACK, P. E. A case of unilateral polydactyly in a 22-mm. embryo. Anat. Rec. 20: 313-319. 1 fig. Feb. 20, 1921.—A 22 mm. human embryo was found to have an extra digit on the radial side of the right hand. This is apparently the youngest polydactyl individual thus far recorded. Unfortunately there is no information as to its parentage. Microscopic study reveals all the usual cartilaginous elements of the hand present and normal. In addition there is a single extra cartilage associated with the supernumerary digit. There are two muscles extending into the extra digit, but no obvious nerves and only capillary blood vessels. The specimen "offers proof that some cases of polydactyly owe their origin to earlier causes than external factors or deviation of ossification centers." The condition is believed to be wholly distinct from hyperphalangy of the thumb.—*C. H. Danforth.*

1928. LITTLE, C. C. Report of the Committee on Genetic Form and Nomenclature. Amer. Nat. 55: 175-178. 1921.—This is the first report of a committee appointed in 1919 by the

American Society of Naturalists, and is a constructive attempt to promote an established system in genetic usage, particularly of symbols for the representation of factors. The report makes the following suggestions: (1) That a type (the wild when possible) be named, and that genetic factors in general be measured by their departure from this. (2) That members of an allelomorphic series dominant to the type be designated by the same symbol as the type in capitals and with appropriate superscripts, and that recessive members have the same symbol in lower case with superscripts. (3) That dominance be recognized by departure from type in the heterozygote. (4) That in addition to literal (mnemonic) superscripts, numerical superscripts may also be used to indicate the relative degree of departure from type of each member of the allelomorphic series. (5) Independent allelomorphs or allelomorphic series may be represented by different letters, or, where they produce similar effects, by the same letter followed by a designating numeral. (6) "Doubtful factors," whose presence is uncertain, may be represented by their respective symbols with superscript x or $?$. (7) The presence of modifiers of the effect of any factor may be represented by the symbol $[+]$; thus $[S+]$ may represent "+ modifiers of the effect produced by the S (spotting) series of allelomorphs," and when it is desired to express the degree of modification, numbers may be used for that purpose, as $[+4.2]$ or $[-2.5]$. (8) "Linkage is best represented by the fractional form used by workers on *Drosophila*."—The report is published in the hope that it will stimulate discussion and suggestions.—*L. J. Cole*.

1929. McCANDLISH, A. C. Environment and breeding as factors influencing milk production. Jour. Heredity 11: 204-214. Fig. 6-15. 1920.—An account of an experiment at the Iowa Agricultural Experiment Station to demonstrate the possibilities of improving a scrub herd. The animals used were inferior as a dairy type and were low producers. These cows were put in with the Station herd and given the same feed and care as the pure breeds. Careful milk and butter-fat records were kept as guides to feeding methods. The scrub cows were mated to pure-bred sires of Holstein, Guernsey and Jersey breeds and the heifer calves resulting were maintained under the same conditions as the other animals. Records are now available on 2 generations of grades descended from scrub cows and 1 animal of the next generation has just entered the herd. The influence of environment upon production is shown by the records. When the scrub cows that came to the station after reaching maturity are compared with those coming at 4 years of age and with those coming before the first freshening, it was found that the former produced 14 per cent more milk and 8 per cent more fat, and the latter 27 per cent more milk and 24 per cent more fat. Scrub bulls will give no improvement in the production of a herd. Pure bred sires on the other hand showed a marked improvement in production in both the 1st generation and 2nd generation grades. The 1st generation taken as a group showed increases of 39 and 37 per cent in milk and fat production respectively when compared with their dams, and the 2nd generation, so compared, increases of 116 and 106 per cent respectively in milk and fat production. Both breeding and environment are thus shown to be important factors in production.—*M. J. Dorsey*.

1930. McROSTIE, G. P. Inheritance of disease resistance in the common bean. Jour. Amer. Soc. Agron. 13: 15-32. 1921.—Crosses between varieties of beans resistant to α and β strains of *Colletotrichum lindemuthianum* and 1 susceptible to α strain only, indicate that resistance to α strain is due to a single factor and is dominant. Crosses between a variety resistant to both strains and 2 varieties susceptible to both strains showed a 2-factor basis for resistance to both strains of the anthracnose fungus. In F_2 a 9:7 ratio was obtained. Significant variations in individual F_2 families are said to be due to difficulty in obtaining uniform conditions for infection in large outside inoculation chamber. Crosses between Robust Pea bean, highly resistant to mosaic disease, and of Flat Marrow bean, which is very susceptible, indicate 2 factors in homozygous state necessary for complete susceptibility. Absence of both factors gives high degree of resistance. One plant in 16 of F_2 generation of 5272 plants was severely infected. All gradations between resistance and susceptibility occurred. Susceptibility showed only partial dominance. Crosses between Flat Marrow, resistant, and Robust Pea, susceptible to root rot (*Fusarium martii phaseoli*), indicated in

F₁ that susceptibility is partially dominant. A condition midway between that of plants showing greatest infection in any particular season and normal condition of healthy plants was chosen to separate classes. F₂ data were checked by growing F₂ families. A 2-factor basis in relation to root rot is indicated. Strains of commercial value resistant to both mosaic and root rot have been selected. On account of their parentage all of these should be resistant to β strain of *C. lindemuthianum*.—J. P. Shelton.

1931. MATHEWS, J. WRENFORD. Sheep and wool for farmers. Cross-breeding experiments. Results of lamb-raising trials. Agric. Gaz. New South Wales 31: 761-770, 846-852. 10 fig. 1920.—In previous experiments, rams of various long-wool breeds had been crossed with Merino ewes to determine which combination resulted in the greatest aggregate value of wool and mutton. None of the combinations produced lambs suitable for the export lamb trade. The present papers discuss in detail the results of crosses between rams of 3 short-wool breeds with ewes from 3 long-wool-Merino crosses. Good lambs were produced by all, but Dorset Horn rams sired consistently heavier lambs than Shropshires or Southdowns, and the Border-Leicester cross ewes were consistently superior to the Lincoln or Leicester crosses.—Sewall Wright.

1932. OSGOOD, WILFRED H. The turkey as a subject for experiment. Amer. Nat. 55: 84-88. 1921.—Author states that there is little genetic work under way "which can be correlated logically with the results of speciation and subspeciation as the field naturalist and taxonomist find them in nature." He thinks the 6 races or subspecies of the American turkey would furnish excellent material for this purpose. If it could be shown that the differences between these "behave as hereditary units without any such blending as requires 'dialectic gymnastics' to explain, it would be a long step forward in the correlation of natural and man-made experiments."—William A. Lippincott.

1933. PAYNE, FERNANDUS. Selection for high and low bristle number in the mutant strain "reduced." Genetics 5: 501-542. 3 fig. Nov., 1920.—In the 6th generation of selection for increase in scutellar bristles in a race of *Drosophila melanogaster* a male appeared with only a single bristle. Starting with the "reduced" strain originated by this fly, plus and minus selection lines were carried on by inbreeding for 60 and 65 generations, respectively, including counts of over 200,000 flies. As in results previously reported by author, in which similar selection lines were started from variations in wild stock, this selection isolated 2 distinct lines. The sorting process was clearly effective for about 18 generations, after which slight progress was made, although no somatic limit had been reached. Minus line continued to produce a few flies with 1 bristle; plus line, a few flies with no bristles. These 2 lines are shown to be genetically distinct by failure of return selections, by maintenance of their differences in mass cultures, and by crosses. It is concluded from linkage tests that a single sex-linked factor differentiates the "reduced" strain as a whole from wild strains; that plus and minus lines within the "reduced" strains differ genetically by 2 plus modifiers, 1 of which is in sex chromosome near miniature, the other in 3rd chromosome near sepia. These modifiers can be passed over to wild selection for high and low bristle number in *Drosophila*, and so produce an extra-bristle race. Author considers this investigation "another link in the chain of accumulating evidence in favor of the multiple-factor hypothesis as an explanation of the effects of selection in bisexual forms."—E. Carleton MacDowell.

1934. PELSENEER, PAUL. L'hybridation chez les mollusques. [Hybridization among mollusks.] Compt. Rend. Acad. Sci. Paris 168: 1056-1059. 1919.—Controlled observations of hybridization among mollusks, occasioned by designation in conchological literature of certain types of individuals as hybrids. In fluviatic forms copulation was observed in various combinations of *Limnaea*. Eggs, egg masses, embryos, and young exhibited exclusively maternal characters. Foreign sperm merely induces development without fertilization. Examination showed retention of an undivided polar body until gastrula stage. In reciprocal crosses of marine forms, *Pholas candida* (lamellibranch) \times *Patella vulgata* (gastropod), larvae conformed to maternal type. In reciprocal crosses of *Pholas candida* \times *Hermella*

alveolata (annelid), larvae were also exclusively maternal. Author concludes that true hybrids are not produced among mollusks. Even closely related and ill-defined species usually produce false hybrids exhibiting maternal characters, and only exceptionally are individuals found which appear to be true hybrids.—*R. E. Clausen*.

1935. PLOUGH, HAROLD H. Further studies on the effect of temperature on crossing over. Jour. Exp. Zool. 32: 197–202. 3 fig. 1921.—Since preliminary work on the 1st and 3rd chromosomes of *Drosophila melanogaster* had indicated that crossing over was not visibly affected by temperature changes, the author undertook experiments to determine why these chromosomes differed from the 2nd where a temperature above or below the optimum causes a significant increase in crossing over. The tests were made at a temperature of 31.5°C., and the crosses were between wild stock and mutant stocks of the 1st and 3rd chromosomes. The controls were kept at a temperature of 22–25°C. The F₁ were back-crossed to the original mutant stocks and the per cents of crossovers calculated. Practically the whole length of these 2 chromosomes was tested in this way. The experiments with the 1st chromosome showed that crossing over in this chromosome is not influenced by temperature or by the age of the female parent. The results with the 3rd chromosome were somewhat different. There was an increase in crossing over in this chromosome due to temperature, in only one region—the sepia-spineless. A variation in crossing over with the age of the female occurred also in this part of the chromosome only. Other regions of the chromosome were unaffected by temperature or age of the female parent. This same section, only, showed a relatively high rate of double crossovers. A similar phenomenon had been found to occur in the 2nd chromosome, where the region which showed high rate of double crossing over was influenced in the amount of crossing over by temperature or age of the female parent. The author interprets these results as indicating that regions where crossing over occurs less freely are the ones which are “sensitive” to the effects of environment.—*Mildred Hoge Richards*.

1936. RAWSON, H. E. Plant-sports produced at will. Proc. Linn. Soc. London 1919: 64–65. 1920.—Through “selective screening” experiments on various plants, such as *Tropaeolum majus* and *Papaver Rhoeas*, author claims to have secured sports and new varieties. By “selective screening,” the author refers to a system of screening plants at selected intervals of daylight. Variations produced by this method are said eventually to have become hereditary or “fixed,” that is, they appeared without “selective screening” in the open garden. A double variety of poppy is believed to have originated in this way. Sudden changes of color or structure were accompanied by sterility. “Selective screening” brings out latent potentialities and causes correlated variations. Work of GARNER and ALLARD [See Bot. Absts. 5, Entry 22] is said to support these views.—*Orland E. White*.

1937. RICHET, CHARLES, ET HENRY CARDOT. La transmission héréditaire des caractères acquis et l'accoutumance des microbes. [The hereditary transmission of acquired characters and the behavior of microorganisms.] Compt. Rend. Acad. Sci. Paris 171: 1353–1358. 1920.—A study of the resistance of lactic-acid bacteria to various chemical substances. A resistance was noted for potassium bromide, saccharose, vanadium, zinc, copper, and phenol; but the organisms became more and more sensitive to mercuric chloride. A specific resistance was developed in successive generations with respect to thallium nitrate, but this race was not resistant to other toxic substances. The development of resistance seems not to be a gradual process, but seems to occur suddenly in the manner of a mutation. These results seem to indicate that in the use of antiseptics, the same one should not be used continuously, but the different types should be alternated.—*Mrs. W. K. Farr*.

1938. RITZMAN, E. G. Breeding earless sheep. Jour. Heredity 11: 238–240. Fig. 31. 1920.—An account of the production of an earless type of sheep, at the New Hampshire Agricultural Experiment Station, by crossing 2 short-eared types. The short ears ranged below 2½ inches in length and were formerly (Jour. Agric. Res. 6: 1916) reported to be the somatic expression of the pure dominant and of the heterozygote, assuming complete dominance. The later results reported show that the pure dominant is somatically earless and that the

short-eared type is the heterozygote. The earless type appeared in a cross between two short-eared parents.—*M. J. Dorsey.*

1939. SAFIR, SHELLY R. Genetic and cytological examination of the phenomena of primary non-disjunction in *Drosophila melanogaster*. *Genetics* 5:459-487. 1 pl., 2 fig. Sept., 1920. —Females of *D. melanogaster* having the 2 sex-linked recessive mutants, eosin eye-color and miniature wings, were out-crossed individually to wild males. The regular offspring of such a cross are wild-type daughters and eosin miniature sons. In addition to these there were produced a few exceptions,—eosin miniature daughters and wild-type sons (245 such cultures yielded: Wild-type ♀ 25,004, w^m ♂ 22,454, w^m ♀ 17, wild-type ♂ 70). The occurrence of such exceptions had been explained by BRIDGES (*Genetics* 1: 1-52, 107-163. 1916) as due to primary non-disjunction of the X chromosomes, i.e., at the reduction division the 2 X chromosomes failed to disjoin, and both remained in the egg or both were extruded to the polar body. The XX type of egg fertilized by a Y sperm gives the matroclinous daughters, and the no-X egg fertilized by X sperm gives the wild-type exceptional sons. Bridges had found 12 such exceptions in a total of 20,484 flies, or a frequency of 1 in 1708. In the cross of eosin miniature female the frequency was 1 in 547, or 3 times as high. The excess was largely of males, which may be accounted for by "elimination" of both X chromosomes at maturation. That the above exceptions were due to primary non-disjunction (rather than to secondary non-disjunction caused by an extra Y chromosome in the mother) was proved in 3 ways: The percentage of exceptions in the individual cultures was significantly lower than that characteristic of XXY females; none of the regular daughters in the exception-producing cultures gave secondary exceptions, although half of them should have done so had the exceptions themselves been secondary; the exceptional sons were invariably sterile, as had been found by Bridges to be characteristic of primary exceptional males. The frequency of primary non-disjunction was tested for 2 other stocks, and was found to give 1 exception in 1453 in the white, and 1 in 1210 in the vermilion. The tests of Bridges and of Safir gave a total of 180,022 flies of which 163, or 1 in 1104, were primary exceptions. It seems probable that the relatively high percentage of exceptions given by the eosin miniature stock was due to a recessive genetic difference. The fact that the primary exceptional male is sterile was proved by extensive tests. Microscopical examination of the testes showed that sperm was scanty and non-motile. The cytoplasm of the cysts was found to be syncytial; the compactness of the bundles of sperm and their non-motility may be a consequence of this difference. The constitution of the primary exceptional males was proved to be XO by direct cytological examination; the spermatogonial cells, in the few clear cases, contained an unpaired rod-shaped X chromosome, with no J-shaped Y chromosome present.—*Calvin B. Bridges.*

1940. SAUNDERS, E. R. On conceptions of the processes of heredity. *Nature* 106: 224-227, 255-258. 1920.—Reduplication theory of BATESON and PUNNETT is contrasted with chromosome theory of MORGAN—the latter reviewed in considerable detail. Case is cited of double-throwing Stocks, which is taken as typical of numerous instances in plants where factorial segregation appears to be premeiotic. Significance of cytoplasm vs. nucleus in hereditary mechanisms is discussed. The author reaches the following general conclusions: Special hereditary processes cannot be attributed to cytoplasm as distinct from nucleus; there is little doubt that in animals the chromosomes represent distributional mechanism, and similarly in plants for such cases as *Drosera*, *Primula*, *Oenothera*, etc.; general applicability of conception of crossing-over is doubtful; in plants, as contrasted with animals, segregation may take place elsewhere than at the recognized reduction division.—*T. H. Goodspeed.*

1941. SEARS, PAUL B. Variation in *Taraxacum*. *Science* 53: 189. 1921.—The suggestion is made that the variation in the amount of dissection of leaves in *Taraxacum* is correlated with age of rosette.—*A. K. Peitersen.*

1942. STAPLEDON, R. G. Plant breeding work at Aberyswyth. *Jour. Ministry Agric. Great Britain* 27: 630-639. 1920.—A popular discussion.—*H. K. Hayes.*

1943. STOUT, A. B. A graft chimera in the apple. Jour. Heredity 11: 233-237. Fig. 28. 1920.—Two types of apples appear on a tree which has never been top-grafted. One type is typical of King and the other is nearly identical with the Roxbury Russet. Chimeral fruits having a King sector with the remainder Russet furnish evidence that this instance is not due to top-working. Mixed tissues are also found in twigs and leaves. It is probable that this chimera developed from a bud that arose on the line of contact between scion and stock and is hence to be considered a graft-chimera. It is possible that some of the fruits show a periclinal relationship.—*M. J. Dorsey*.

1944. STURTEVANT, A. H. Genetic studies on *Drosophila simulans*. I. Introduction. Hybrids with *Drosophila melanogaster*. Genetics 5:488-500, 5 fig. Sept., 1920.—Author relates circumstances leading to the discovery of *D. simulans* Sturtevant as a species common and very similar to *D. melanogaster* Meigen. He describes differences between the 2 species, and presents the results of crosses between normal males of each species mated to females of the reciprocal species. Normal females were used, and also females that, as a result of non-disjunction, carried a Y chromosome as well as the two X chromosomes. Odd sex ratios are usual in the progeny of all matings between these species. The following postulate is found to account for the results: "In general, it appears that hybrids develop only if they carry a *simulans* X, but that in the presence of *simulans* cytoplasm a *melanogaster* X usually inhibits development even though a *simulans* X is also present." The hybrids are intermediate to their parents in appearance and are sterile. Author describes distributional range of *D. simulans*, comments on sex ratios in hybrid progeny of other groups of animals, and closes with a paragraph on sexual selection in these species of *Drosophila*.—*John S. Dexter*.

1945. SWINGLE, WILBUR WILLIS. The germ cells of Anurans. I. The male sexual cycle of *Rana catesbeiana* larvae. Jour. Exp. Zool. 32: 235-331. 15 pl., 2 fig. 1921.—The present paper is the first of a series upon the history of germ-cells of Anurans. Sexual cycles are described in male tadpole of bull-frog, *Rana catesbeiana*, which usually exists as tadpole for 2 years. Two cycles occur, the 1st during the 1st year, the 2nd during the 2nd year, just before metamorphosis. Germ-cells of 1st cycle arise from primordial germ-cells, pass through maturation stages as far as metaphase of 1st division, after which the cells degenerate at once or form spermatid-like cells which degenerate. The 28 chromosomes and 14 tetrads strikingly duplicate those of the Urodeles in their appearance, size, and behavior. The 2nd cycle takes place in cells which are products of prolific and rapid multiplication of a few primordial germ-cells which did not participate in the 1st cycle, and possibly also of germinal epithelial cells. This cycle gives rise to normal mature sperm at time of metamorphosis. These cells and their chromosomes are much smaller than those of 1st cycle and are typical of adult Anurans; this difference is due possibly to rapid succession of divisions producing them, and to loss of water in metamorphosis. Metamorphosed males continue to produce sperm until large enough to copulate. Author predicts a similar abortive cycle for female, now under investigation. A still more precocious abortive cycle for *Rana pipiens* and the toad is reported. History of germ-cells of other vertebrates which also possess an abortive cycle is reviewed. These precocious abortive cycles are interpreted as another case of "recapitulation of the germ-cell cycle to past phylogenetic sexual conditions when vertebrates ripened their sexual products at an earlier developmental stage than at present." The above history is an important consideration among Europeans in determining the sex of tadpoles, which is also to be discussed later.—*C. L. Parmenter*.

1946. SWINGLE, W[ILBUR] W[ILLIS]. Neoteny and the sexual problem. Amer. Nat. 54: 349-357. 1920.—The present paper is preliminary to a series of papers upon sex of Anuran tadpoles and their sexual cycle. From a study of the gonads of tadpoles of *Rana catesbeiana* (bull-frog) which metamorphoses usually during the 2nd year, author concludes that R. HERTWIG, KUSCHAKIEWITZ, and WITSCHI misinterpret meaning of sexual cycle in European frogs, that the tadpoles are not at first largely females with a few hermaphrodites,—from both of which males later develop,—but that both male and female tadpoles exist in equal numbers. Error exists in the assumption that the behavior of tadpole germ-cells parallels

that of many mammals in which the female cells undergo early stages of maturation before birth, while those of males delay until near sexual maturity. Author observes that both male and female tadpoles undergo early maturation stages simultaneously. Cells of male undergo 2 cycles: First cycle during 1st year reaches 1st maturation division and aborts; 2nd cycle during 2nd year produces mature sperm just before metamorphosis. Pachytene cells of female tadpole enter growth stage and become typical oocytes. So-called "oocytes" in male tadpole and newly metamorphosed frog arise during growth stage but later degenerate. Presence of yolk-bearing cells is not a good sex criterion since male cells of *Ascaris* and the Prosobranchs form yolk. Author suggests that "oocytes" are of same nature as cells of Bidder's organ, that due to precocious sexual cycle some germ-cells not able to complete their cycle grow to an abnormal size and appear as oocytes.—C. L. Parmenter.

1947. THOMPSON, DAVID H. A new type of sex-linked lethal in *Drosophila*. [Abstract.] Anat. Rec. 20: 215. 1921.—A new sex-linked recessive factor has appeared which kills females in double dose and can be recognized in the males which it does not kill. In these males it affects the mesothorax since the wings are held erect and the 2nd pair of legs is feeble. Crosses between heterozygous females and erect males give a sex ratio of 1 female to 2 males while other lethals give ratios of 2 females to 1 male. Linkage experiments indicate a locus of about 38 in the sex chromosomes. The lethal effect and the character "erect" are manifestations of the same factor as indicated by the absence of crossing over between the two. This erect lethal kills females homozygous for it while other sex-linked lethals kill males. The possibility is offered of producing balanced lethals in the sex chromosomes. Recently a dominant accessory factor has appeared which makes erect dominant in the heterozygous females.—David H. Thompson.

1948. THOMSON, J. ARTHUR. [French rev. of: CASTLE, W. E. Studies of heredity in rabbits, rats and mice. Carnegie Inst. Washington Publ. 288. 56 p., 3 pl. 1919.] Scientia 29: 142-144. 1921.

1949. THOMSON, J. ARTHUR. [French rev. of: MORGAN, T. H., AND OTHERS. Contributions to the genetics of *Drosophila melanogaster*. Carnegie Inst. Washington Publ. 279. 388 p., 12 pl., 105 fig. 1919.] Scientia 29: 144-145. 1921.

1950. TISCHLER, G. [German rev. of: OSTENFELD, C. H. Kimdannelse uden befrugtning og Bastarddannelse hos nogle Kurvblomstrede samt disse Forholds Betydning for formernes constans. (Studies on fertilization and hybridization in Compositae and their significance for the production of constant forms.) K. Vet. og Landbohjiskole Aarskr. 1919: 207-219. 1 fig. 1919.] Zeitschr. Indukt. Abstamm.- u. Vererb. 25: 176. 1921.

1951. WEINSTEIN, ALEXANDER. Homologous genes and linear linkage in *Drosophila virillis*. Proc. Nation. Acad. Sci. 6: 625-639. 2 fig. Nov., 1920.—Author describes "crossveinless," a sex-linked mutant character in *Drosophila virilis* which constitutes a 3rd possible parallel to sex-linked characters in *Drosophila melanogaster*. Data are given on linkage of factors for crossveinless and hairy with other factors; also evidence of linear linkage as opposed to 3-dimensional linkage in this species. Data are presented on coincidence, indicating that coincidence resembles that in X chromosome of *D. melanogaster*. Author discusses question of "homology of apparently similar factors" and answers the question "are genes with similar somatic effects chemically similar?" in the negative.—C. W. Metz.

1952. WELLINGTON, R. Recent investigational work with the tomato. Trans. Peninsula Hort. Soc. [Delaware] 9: 73-76. 1920.—Author notes that F_1 seed usually gives a greater yield than either parent and produces a uniform product. An objection is that crossed seed must be used each season. Method of producing crossed seed is given.—Work of previous investigators is reviewed, all of whom obtained increased yields in F_1 over the parent varieties.—In experiments conducted at Minnesota, 1911-1918, the average increase was nearly 4 pounds per plant, including green and ripe fruit, but not all crosses were equally productive,

nor did all give the same increase each season. Smoothness and earliness are additional factors noted as a result of the cross.—Important difference between yield of same strain in different years is noted, also the importance of regulating plantings to suit weather conditions. Author cites results secured with wilt-resistant varieties originated by the United States Department of Agriculture and the Maryland Agricultural Experiment Station.—*C. E. Myers.*

HORTICULTURE

J. H. GOURLEY, *Editor*

H. E. KNOWLTON, *Assistant Editor*

(See also in this issue Entries 1584, 1595, 1599, 1705, 1712, 1724, 1811, 1824, 1858, 1891, 1910, 1922, 2002, 2013, 2101, 2112, 2120, 2122, 2129, 2138, 2181, 2189, 2192, 2223, 2249)

FRUITS AND GENERAL HORTICULTURE

1953. ANONYMOUS. Apple—Maidstone Favorite. *Jour. Pomology* 1: 61-62. *Pl. 1*. 1919.—A technical description of a promising variety of apple originating as a seedling and raised by Messrs. George Bunyard and Co., Ltd.—*L. H. MacDaniels.*

1954. ANONYMOUS. The first year under quarantine. *Amer. Nurseryman* 33²: 32, 35. 1921.—A report is given on the working of Quarantine 37 for the first year of its operation. Data show that there were practically as many fruit stocks imported under the quarantine measure as during the year previous. While such stock is not under quarantine, it however refutes the argument that foreign growers had refused to sell to American importers as a retaliation for Quarantine 37. Data and other facts regarding the law are incorporated in this report.—*J. H. Gourley.*

1955. ANONYMOUS. The patenting of new fruits. *Jour. Pomology* 1: 50-53. 1919.—There is a strong movement in France to pass laws giving the originator of a new variety exclusive rights to its propagation for a period of years as a recompense for his labor. Such a movement is objected to because in the case of fruits it would be impossible in many cases to tell whether the variety is new or merely an old one rediscovered, or a seedling which has come true to type. It is of greater advantage to the originator to have the advertisement that comes from the introduction of his discovery by well established nurseries than to have the temporary financial gain from independent propagation.—*L. H. MacDaniels.*

1956. ANONYMOUS. The pomological conference at Metz, Sept. 4th, 1919. *Jour. Pomology* 1: 59-61. 1919.—A short account of the conference, with brief comment.—*L. H. MacDaniels.*

1957. ANONYMOUS. A review of "Fruit Culture and Science." By the Duke of Bedford and Spencer Pickering. [Macmillan and Co.: London, 1919. *xix* + 348 p., 47 fig.] *Jour. Pomology* 1: 41-49. 1919.—A summary of the book in question with some adverse criticism of the manner of conducting the experiments and the interpretation of data. The author is further criticized for not giving sufficient weight to the effect of stock on scion and variation in the growth habit in varieties. The criticism is for the most part favorable. The part played by Mr. Pickering in horticulture is likened to that played by Bernard Shaw in politics and ethics. Whatever else he may have done he has aroused us from our lethargy.—*L. H. MacDaniels.*

1958. BECKWITH, CHARLES S. A complete cranberry fertilizer for Savanna bottom. *Proc. Ann. Meeting Amer. Cranberry Growers' Assoc.* 50: 5-7. 1920.—As a result of tests extending from 1913 to 1918 the following tentative formula for a fertilizer for cranberries on Savanna land is advised: 75 lbs. nitrate of soda, 75 lbs. dried blood, 300 lbs. rock phosphate, and 50 lbs. sulphate of potash. In 1919, tests were made with different amounts per acre of this mixture with varying amounts of acid phosphate. The heaviest yield followed an application

of 800 lbs. of the above mixture with 150 lbs. acid phosphate, a 24 per cent increase over the unfertilized plot. Increasing the amount to 1050 lbs. plus 800 lbs. acid phosphate increased the yield only 12 per cent, and the berries were oversized and soft.—*J. K. Shaw.*

1959. BERGMAN, H. F. Observations on the accumulation of carbon dioxide from strawberries in refrigerator cars. *Science* 53: 23. 1921.—During the years 1918 and 1919 the writer made observations on the CO₂ and O₂ content of air in refrigerator cars, and the effect of ventilation on the accumulation of CO₂. In the tests of 1918, berries were loaded at a temperature of about 68–70°F., and one car was ventilated by raising the hatches at diagonal corners of the car. In the tests of 1919, the berries were loaded at a temperature of 76–78°F., and one car was ventilated by raised hatches. From the table it is apparent that there is no great accumulation of CO₂ in the air of unventilated cars in transit. The maximum of 2.5 per cent dropped to 0.7 per cent when the car was iced, and again increased to 1.3 per cent, never exceeding this amount during the remainder of the journey. In ventilated refrigerator cars the percentage of CO₂ is lower. It may, while the cars are standing, become nearly or quite as great as in unventilated cars, but when the cars are moving it drops to 0.2–0.4 per cent. It is concluded that the accumulation of CO₂ in unventilated refrigerator cars is apparently not sufficient, in the case of strawberries, to cause injury to the berries.—*A. H. Chivers.*

1960. BERGTHOLDT, J. E. President Bergtholdt's address to the Californians. *Amer. Nurseryman* 33²: 8. 1921.—This address consists largely of suggestions for the betterment of the California Association of Nurserymen but it includes statements to justify the high price of nursery stock. Data are presented to show that California-grown fruit trees are cheaper than eastern-grown stock of the same size and quality.—The nurserymen cannot, on the average, secure a yield of trees greater than 70 out of 100 planted, and out of the 70 not more than 49 will, over a period of years, be sold. This loss of over 50 per cent must be absorbed by the trees that are actually sold; this in part explains the high price of nursery stock.—*J. H. Gourley.*

1961. BUNYARD, EDWARD A. The length of stem in pears and apples. *Jour. Pomology* 1: 20–22. 1 fig. 1919.—Fruits borne at the center of a cluster, in the case of apples, or at the tip of the cluster base, in the case of pears, have shorter stems than those borne laterally. The great variation in the length of stem within a variety renders this character of little value in the classification of varieties.—*L. H. MacDaniels.*

1962. BUNYARD, EDWARD A. Seedling apples—a record of some growers' experiences. *Jour. Pomology* 1: 110–115. 1920.—A discussion of some of the results of applebreeding experiments in England, Canada, and the United States. It is concluded that most of the varieties that have been used in crossing behave as if genetically pure, and transmit their characters to the seedling. A method of bringing seedlings into early bearing by cutting the tap root is briefly described.—*L. H. MacDaniels.*

1963. CHAMBERS, F. S. Report of the research committee of the American Cranberry Growers' Association. *Proc. Ann. Meeting Amer. Cranberry Growers' Assoc.* 50: 7–10. 1920.—Investigations conducted since 1913 appear to indicate that various cranberry soils have different degrees of acidity. Cranberries will grow well in soils of slight acidity, also in soils that are very acid. Red-root (*Ceanothus americanus*) and double-seeded millet can apparently tolerate a greater acidity than the cranberry.—*J. K. Shaw.*

1964. CHASSET, L. En culture fruitière intensive: croisillon et gobelet nain; comparaison des deux formes. [Comparison of the cross-bar and dwarf-goblet forms in intensive fruit culture.] *Rev. Hort.* 92: 191–192. 1920.—When spaced 2 meters apart, the cross bar type of tree would possess, when developed, 33,200 meters of wood capable of carrying fruit-spurs, whereas the goblet type would possess 50,000 meters. On rich soils, however, it would be necessary to space the goblet-form trees 3 meters apart, in which case the length of spur-producing wood would be reduced to 33,000 meters, but all of this would be advantageously

exposed to light and air. The latter type is a desirable form for plum, cherry, and peach trees.—*E. J. Kraus.*

1965. DURHAM, H. E. The recognition of fruit—graphic records. *Jour. Pomology* 1: 28-36. *Fig. 2-4.* 1919.—The author emphasizes the necessity of uniform and accurate methods in making graphic records in the description of varieties of apples and pears. Longitudinal, transverse, and crown sections should be made, the last named to pass through the blossom end just below the calyx. The calyx, calyx tube, position of stamens, core fruit, and "axial sac," or intercarpellary space, are considered to be important characters. A method for tracing fruit outlines without cutting specimens is given.—*L. H. MacDaniels.*

1966. GOULD, W. M. Production of nursery stock. *Amér. Nurseryman* 33²: 44, 46. 1921.—A detailed discussion of the practices in the nursery.—*J. H. Gourley.*

1967. GUILLAUMIN, A. Citranges, limonanges, satsumanges. *Rev. Hort.* 92: 157-159. *Fig. 54.* 1920.—The author characterizes further some of the known *Citrus trifoliata* crosses and summarizes those known to date as follows: *Triptera* × *Bigaradier* = Citrange stock; Orange × *Triptera* = Citranges Armand Bernard, Rusk, Montauban improved; *Triptera* × Orange = Willist citrange; Lemon × Citrange = Montauban Limonage; *Triptera* × *Satsuma* = Norman Satsumange; Citrange × Citrange. [See also *Bot. Absts.* 7, Entry 1911.]—*E. J. Kraus.*

1968. HATTON, RONALD G. Black currant varieties—a method of classification. *Jour. Pomology* 1: 65-80, 145-154. *Fig. 5-15, 17-26.* 1920.—All varieties of black currant are derived from the single species *Ribes nigrum* Linn. The nomenclature of the horticultural varieties has been greatly confused. It is important to correct this because of the great variation in the varieties as to disease and pest resistance, bearing, adaptability to soil types, etc. Varieties are divided into the "red bud" and "whitish bud" types on the basis of bud color, and each type into two groups on the basis of growth habit, bud characters, season of flowering, and minor differences in inflorescence, flower, leaf, and fruit. The most prolific variety is the Baldwin, which has as its chief defect susceptibility to gall mite infection.—A review of literature is included.—*L. H. MacDaniels.*

1969. HEINE. Düngungsversuche im Obstbau. [Fertilizer experiments in fruit culture.] *Mitteil. Deutsch. Landw. Ges.* 36: 97-100. 1921.—A general discussion of facts to be considered in carrying on fertilizer experiments with fruit trees. From experiments conducted at Dahlem, the author concludes that at least 12 trees should be selected for every treatment proposed.—*A. J. Pieters.*

1970. HOOPER, CECIL H. Notes on insect visitors to fruit blossoms. *Jour. Pomology* 1: 116-124. 1920.—Honey bees are the most frequent visitors of fruit blossoms of all kinds in England. In the case of apple blossoms they comprise about 70 per cent of the visitors, bumble bees, other wild bees, and flies being next in order. Bees, because of their hairy coats, are considered better pollen carriers than beetles or ants. Lists of insects visiting fruit blossoms in Germany are copied from the work of Hermann Müller.—*L. H. MacDaniels.*

1971. KEEBLE, FREDERICK. Intensive cultivation. *Nature* 106: 293-296. 1920.—Production of vegetables, fruits, and potatoes under war time conditions is discussed.—*O. A. Stevens.*

1972. LAXTON, EDWARD. On raising seedling apples. *Jour. Pomology* 1: 104-109. 1920.—A brief account of the apple breeding work of the author and his brother. About 500 crosses were made and 5000 seedlings raised. Eighty of the most promising crosses are listed and briefly described. Many of the seedlings have much of the flavor and quality of Cox's Orange, a variety used in most of the dessert crosses. Crossing dessert and cooking varieties was found unsatisfactory in practically every case.—*L. H. MacDaniels.*

1973. MERCIER, C. The electrification of seeds. *Sci. Prog.* [London] 13: 482-485. 1919.—More than 2000 acres have been planted with electrified seeds of different kinds. This treatment has been found to be very beneficial and has resulted in an increase in yield, in weight per bushel of the seed, in the length and strength of the straw, and in the number of plants from each seed. Every kind of seed requires a special treatment, the details of which have not all been worked out. The rationale of the process is unknown.—*J. L. Weimer.*

1974. MOREL, F. Vignes des jardins et raisins de table. [Garden vines and table grapes.] *Rev. Hort.* 92: 219. 1920.—Attempts to produce grape vines resistant to attacks by fungi and at the same time productive of high quality fruits are meeting with fair success. The selection of new forms should be severe, retaining only the best.—*E. J. Kraus.*

1975. POPENOE, WILSON. The Colombian berry or giant blackberry of Colombia. *Jour. Heredity* 11: 195-203. *Fig. 1-4.* 1920.—An account of a hitherto unknown species of *Rubus* from Colombia, South America, of great interest to horticulturists and fruit breeders. The fruit sometimes reaches a length of $2\frac{1}{4}$ inches and the plant makes a strong vigorous growth. The color of the berry is light crimson turning to a wine color when overripe. The quality is not high but selection may bring out superior varieties. While the species has not been determined it was thought to be *R. roseus*. The plant prefers a moist, cool climate and will probably be of most value in the southern states in the U. S. A.—*M. J. Dorsey.*

1976. RIDER, A. J. Studies in cranberry culture. *Proc. Ann. Convention Amer. Cranberry Growers' Assoc.* 51: 1-3. 1920.

1977. ROSS, J. C., AND S. W. VAN NIEKERK. The manuring of vineyards. *Jour. Dept. Agric. Union of South Africa* 2: 163-169. 1921.—Various formulae, all calculated to supply standard quantities of nitrogen, phosphoric acid and potash are given with costs. Attention is called to the fact that different soils vary in fertilizing requirement and a simple plan is suggested by which the vineyardist may test the needs of his own soils. On sour soil lime is needed.—*A. J. Pieters.*

1978. TABOURY, M. F. Injections dans les plantes pour augmenter leur rendement. [Injections in plants to increase fruit returns.] *Nat. Canadien* 47: 145-146. 1921.—An old pear tree which flowered but did not fruit was subjected to the following treatment: A little above the ground the trunk was perforated to the vascular bundles, and a small glass tube inserted communicating with 18 l. of a solution containing 19 gr. FeSO_4 and 10 gr. NaNO_3 ; the tree absorbed the solution in about 3 days. The following month the leaves were larger and more vigorous than those of 2 untreated trees, and the tree produced numerous fruits, while the control trees produced none.—In 1913, M. CALVINO similarly employed on a sterile pear tree the following solution: H_2O 20 l., super-phosphate 5 gr., K_2SO_4 5 gr., NaNO_3 5 gr., and FeSO_4 5 gr. The tree absorbed 50 l. of the solution just before flowering, with good effect in flowers and fruitage. A lilac grafted on privet and similarly treated, had a much more vigorous and abundant bloom than usual.—*A. H. MacKay.*

1979. TERRY, H. B. Pruning of deciduous fruit trees. *Jour. Dept. Agric. Union of South Africa* 2: 177-184. 1921.—Practical directions, with illustrations, for pruning so as to give trees the "goblet" or "vase" form said to be the best form for South African conditions.—*A. J. Pieters.*

1980. TRIBOLET, I. The pecan nut. *Jour. Dept. Agric. Union of South Africa* 2: 129-132. 1921.—The culture of the pecan nut is discussed and it is suggested that the growing of the pecan might prove highly remunerative in parts of South Africa, especially in Natal.—*E. M. Doidge.*

1981. TRIBOLET, I. Walnuts. Jour. Dept. Agric. Union of South Africa 2: 80-81. 1921.

FLORICULTURE AND ORNAMENTAL HORTICULTURE

1982. ANONYMOUS. The American holly. Nation. Nurseryman 29²: 33. 1921.—This plant has withstood the smoky atmosphere of St. Louis better than most other plants. "For a city evergreen the holly is therefore recommended above all other evergreens on account of its smoke-resisting qualities."—Attention is called to the general dioecious habit of the plants and the consequent necessity of planting staminate and carpellate trees close together in order to secure pollination.—*J H Gourley.*

1983 ANONYMOUS. Native plants at the National Botanic Gardens. South African Gard 11: 11, 45. 3 fig. 1921.

1984. ANONYMOUS. Note. [Rev. of: PEMBERTON, J. H. Roses: their history, development and cultivation. 2 ed., xxiv + 334 p., 9 pl. Longmans Green and Co.: London, 1920.] Nature 106: 371. 1920.

1985. ALBERT, C. Le fenouil de Florence: Il Fenocchio. [Fennel from Florence, Il Fenocchio.] Rev. Hort. 92: 220. Fig. 56. 1920.—Differing from the common fennel, the leaf bases of this variety produce a scaly bulb, the interior of which is tender and edible. It is used in either the cooked or uncooked state. Seeds sown in March produce marketable plants in June and July, while those sown in September yield large plants the following April.—*E. J. Kraus.*

1986. ENFER, V. Chauffage des serres: les lignites et la tourbe. [Heating greenhouses: lignites and peat.] Rev. Hort. 92: 218-219. 1920.—Both of these materials may be used as substitutes for coal, the latter when used in conjunction with coal or when made into briquettes, is a good fuel. Large quantities of peat are available at many places in France.—*E. J. Kraus.*

1987. ENFER, V. Utilisation des serres avec chauffage: production des légumes. [Utilization of greenhouses with heat: production of vegetables.] Rev. Hort. 92: 195-196. 1920.—Specific suggestions on growing various crops.—*E. J. Kraus.*

1988. GADECEAU, E. Le drapeau belge: Abutilon megapotamicum. [The Belgian flag—A. megapotamicum.] Rev. Hort. 92: 214-215. 1 pl (colored). 1920.—This form is dedicated to King Albert I of Belgium because the colors of the flower are arranged as are those of the Belgian flag; the calyx is red, the corolla yellow, and the stamen mass brown-black. The plant is free flowering and of easy culture.—*E. J. Kraus.*

1989. HEEDE, A. VAN DEN. Les plantes vivaces et rustiques: les juliennes a fleurs doubles. [Perennial and hardy plants: double flowered Hesperis.] Rev. Hort. 92: 198. 1920.—The single flowered forms of *Hesperis matronalis* generally persist from year to year. The white, double flowered form, however, usually dies out the 2nd year following planting. This difficulty can be completely avoided by dividing the old plants in August, or by making cuttings from the stems, and transplanting to a new situation.—*E. J. Kraus.*

1990. KRELAGE, E. Nouvelles tulipes hybrides. [New hybrid tulips.] Rev. Hort. 92: 196-197. 1 pl (colored). 1920.—Systematic hybridizing of tulips was undertaken 20 years ago. Crossing *Tulipa retroflexa* with a rose colored Darwin tulip resulted in a variety, Sirène, with distinctly reflexed petals, flowering for the first time in 1908. Other varieties with similar lily-like flowers, in various colors, are being produced each year. Three other distinct groups of varieties are listed as follows: (1) Pure white forms particularly adapted for forcing; (2) forms possessing absolutely new colors or attractive combinations of colors; (3) yellow varieties of the true globular Darwin type, of which none existed previously. Many of the varieties are still on trial, many hundreds have been discarded, and each year many new seedlings bloom for the first time.—*E. J. Kraus.*

1991. LAMBERT, F., ET P. PÉRONNE. *Le Tchê* (*Cudrania Triloba*, Hance). [*Cudrania triloba*.] Ann. École Nation. Agric. Montpellier 17: 81-104. Fig. 1-10. 1918 [1919].—*Cudrania* is a small tree or shrub with thorns. It was found that the mulberry silk worm which eats the leaves of *Cudrania* is less susceptible to disease. Its roots contain a yellowish-red coloring matter which can be easily extracted. As a hedge plant it is valuable because of its thorns. It thrives where the mulberry grows but prefers deep cool sandy soil. It is propagated easily by root cuttings or by layering.—F. F. Halma.

1992. LESOURD, F. *Trois nouveaux lauriers roses*. [Three new oleanders.] Rev. Hort. 92: 216-217. Fig. 56-57. 1920.—The varieties Rochelais, Single Crimson; Botaniste Faideau, Double Rosy White, with the backs of the petals rose lilac; and Aunissien, double rose lilac, are described and the characteristics noted.—E. J. Kraus.

1993. MOTTET, S. *Un nouveau Liquidambar, L. formosana Hance*. [A new Liquidambar.] Rev. Hort. 92: 192-194. Fig. 55. 1920.—This species, though long known botanically, has scarcely been used as an ornamental. The young trees grow rapidly, develop attractive colors in autumn, and should prove useful along avenues or in groups.—E. J. Kraus.

1994. PHILLIPS, E. P. *Crotalaria Agatiflora*, Schwenif. South African Gard. 10: 457. 1 fig. 1920.

1995. ROLET, A. *Le froid artificiel régulateur des marchés dans le commerce des fleurs coupées*. [Refrigeration, a regulator of the cut flower trade.] Rev. Hort. 92: 190-191. 1920.—The need, expense, and use of precooling stations and refrigerator cars are discussed.—E. J. Kraus.

1996. VACHEROT, M. *Vanda Sanderiana*. Rev. Hort. 92: 213-214. Fig. 55. 1920.—Historical and cultural notes.—E. J. Kraus.

1997. WARNAAR, W., EN YAN ROES. *Verslag van de Commissie bot het bestudeeren van den toestand van den bloembollenteelt in Engeland*. [Report of the committee to study bulb raising in England.] Weekbl. Bloembollencult. 30: 13-16. 1919.—The reports of a series of studies on bulb growing in England are given, especially with reference to the culture, pests, and diseases.—J. C. Th. Uphof.

1998. WYMAN, L. *Tree planting in Texas towns and cities*. Texas Agric. Exp. Sta. Forest. Bull. 11. 39 p., 10 fig. 1920.—Information is given as to kinds of trees adapted to wide and narrow streets, to open lawns, and to different sections of the state.—A map of the state showing counties is divided into 5 regions. Trees suitable for each region are listed.—A table of 83 trees is given, listing the common name, scientific name, rate of growth, length of life, value for street planting, width of street to which adapted, and desirable features. A few pages are devoted to the care of the tree, diseases, and pruning.—Texas dealers in shade trees are listed.—L. Pace.

VEGETABLE CULTURE

1999. LAMPROY, E. *Culture de la pomme de terre dans la mousse*. [Potato culture in moss.] Rev. Hort. 92: 214. 1920.—Tubers of early varieties placed in pots of fresh moss and kept moist by watering every 2 or 3 days will yield a few tubers in about 1½ months. No fertilizer is used. The method is for amateurs only.—E. J. Kraus.

2000. WEIRUP. *Gemüsesorten*. [Varieties of vegetables.] Mitteil. Deutsch. Landw. Ges. 35: 663-664. 1920.—The author gives a list of the best varieties of peas, beans, carrots, cabbage, and onions.—A. J. Pieters.

2001. YOUNGKEN, HEBER W. *Studies on the Cassaba and Honey Dew melons*. Amer. arm. 93: 104-115. Fig. 12. 1921.—An investigation into the origin, history, struc-

ture, and chemical constitution of two cucurbitaceous fruits, namely, "Cassaba" and "Honey Dew Melon." Both melons undoubtedly belong to the group known as the *Inodorous* variety of *Cucumis melo*. This species contains an extraordinary number of varieties and strains, arranged in ten groups as follows: Canteloups, brodes, sucirins, melons d'hiver, serpents, forme de concombre, Chito, Dudain, rouges de Perse, and sauvages; each of these groups contains varieties or nearly allied races. The Cassaba melon, also known as "Kassaba," "Casaca," "Casabad," and "Casba," was named for the town of Kassaba, about 15 or 20 miles from Smyrna, where it was extensively grown and whence it was introduced into this country. Hundreds of acres are now grown each year in the San Fernando valley of southern California. The Honey Dew melon is an old renamed winter melon from the south of France. It is grown quite extensively at the present time in Colorado. The paper is well illustrated by a series of photographs of the entire fruits and of fruits in cross section, as well as a number of sketches of the histological characteristics. A chemical analysis is also included.—*Anton Hogstad, Jr.*

MORPHOLOGY, ANATOMY AND HISTOLOGY OF VASCULAR PLANTS

E. W. SINNOTT, *Editor*

(See also in this issue Entries 1826, 1869, 1888, 1905, 2001)

2002. BLAUW, A. H. Over de periodiciteit van *Hyacinthus orientalis*. [On the periodicity of *Hyacinthus orientalis*.] Mededeel. Landbouwhoogeschool Wageningen 17: 1-82. *Pl. 1-5, fig. 1-46*. 1920.—The periodic development in leaf formation, flower formation, and the extension of rest periods are considered. During the leaf-formation period in April a bud lies against the flower stalk, implanted on the disc in the axil of the innermost of the assimilating leaves. The earliest evidence of the bud dates from the end of the July of the previous year, and this bud forms the leaves which will function 2 years later. It consists of a few leaf primordia round a growing point. Of these, the 2 outer will not develop into foliage leaves but into scale leaves, remaining in the bulb. Such scale leaves and the basal parts of the foliage leaves become scales of the bulb.—Flower formation takes place during the leaf forming period in June, and the growing apex at that time is still low and flat. After the leaves and roots have died and the bulbs have been dug, the growing point of the inflorescence rises and reaches a length of 300-400 μ . No outward differentiation is visible. Soon the flower primordium appears as a shallow groove on the wall which is to become the bract. At the end of August several flower primordia appear, each with a floral bract. At the beginning of September the 3 carpels are differentiated but are still open; they close at the end of September. During late October, the reduction division of pollen mother cells takes place. In dry-lying bulbs, a resting period now takes place. Low temperature during the growing season greatly retards the development of floral and vegetative parts.—*J. C. Th. Uphof*.

2003. CAMMERLOHER, HERMANN. Der Spaltöffnungsapparat von *Brugmansia* und *Rafflesia*. [The stomata of *Brugmansia* and *Rafflesia*.] Österreich. Bot. Zeitschr. 69: 153-164. *Pl. 3, fig. 1-5*. 1920.—Stomata are present in lower epidermis of perianth in both forms, absent on other leaves. Upper surface is composed of small irregular cells, with occasional hairs; lower epidermis is smooth, with distinct layers of cuticle. Stomata of *Brugmansia* have 2, 3, or 4 guard cells; those of *Rafflesia* are typically 4-celled. Many stomata are abortive and it was not determined whether any performed functions of stomata or not.—*E. M. Gilbert*.

2004. COULTER, J. M. Embryogeny in angiosperms. [Rev. of: SOUBÈGES, R. (1) Embryogénie des Liliacées. Développement de l'embryon chez l'*Anthericum ramosum*. (Embryogeny of the Liliaceae. Development of the embryo of *Anthericum ramosum*.) *Compt. Rend. Acad. Sci. Paris* 167: 34-36. 1918 (see Bot. Absts. 2, Entry 484). (2) Embryogénie des Poly-

gonacées. Développement de l'embryon chez le *Polygonum Persicaria*. (Embryogeny of the Polygonaceae. Development of the embryo in *Polygonum Persicaria*.) Compt. Rend. Acad. Sci. Paris 168: 791-793. 1919 (see Bot. Absts. 5, Entry 581.) Bot. Gaz. 68: 486. 1919.

2005. CUTTING, E. M. [Rev. of: CHURCH, A. H. On the interpretation of phenomena of phyllotaxis. Bot. Mem. [Oxford] 6. 58 p. 1920 (see Bot. Absts. 9, Entry 337).] Sci. Prog. [London] 15: 148. 1920.

2006. GATIN, V. C. Recherches anatomiques sur le pédoncule et la fleur des Liliacées. [Anatomical investigations of the peduncle and flower of the Liliaceae.] Rev. Gén. Bot. 32: 561-591. Fig. 56-60. 1920.—The final chapters of the investigations previously reported are here given. They comprise a study of the subfamilies Dracenoideae and Colchicoideae together with a summary of the relationships within the Liliaceae, and between this group and the neighboring families Juncaceae, Dioscoreaceae, Haemodoraceae, Amaryllidaceae, and Iridaceae as far as such relationships are shown by the anatomy of the peduncle and flower.—J. C. Gilman.

2007. GRAVIS, A. Connexions anatomiques de la tige et de la racine. [Anatomical connections between stem and root.] Bull. Acad. Roy. Belgique, Cl. Sci. 1919⁴: 227-236. 1919.—There is no true transition between these organs. The union of the conducting strands in the 2 regions is brought about (in young plants) by means of special cell groups (triads) composed of 1 group of centripetal vessels situated between the 2 halves of a fibro-vascular bundle consisting of centrifugal wood. At a level above this point, the 2 halves unite and the centripetal vessels disappear. At a lower level it is the centrifugal wood which disappears, and the bast bundles alternate with the centripetal wood strands. The author has studied various types of triads, and suggests solutions for the problems of the circulation of water in the young plant, the morphological value of the single cotyledon of monocotyledons and the evolutionary origin of these plants, the character of the so-called pseudo-monocotyledonous plants, the origin of the structure of stem and root from the point of view of phylogeny, and the significance of the triads.—Henri Michéels.

2008. HAAN, H. R. N. DE. Contribution to the knowledge of the morphological value and the phylogeny of the ovule and its integuments. Recueil Trav. Bot. Néerland. 17: 219-322. Fig. 1-12. 1920.—The structure of the ovule and in particular of its integuments is described in detail for the fossils *Lepidocarpon*, *Miadesmia membranacea*, *Lagenostoma Lomaxii*, *Sphaerostoma ovale*, *Physostoma elegans*, *Trigonocarpus Parkinsoni*, *Mitrospermum compressum*, and *Bennettites*; and (in living plants) for 7 genera of cycads, for *Ginkgo*, for 8 genera of conifers, and for 3 of Gnetales. Ovular characters are critically compared throughout this wide range of plants in an attempt to determine the evolutionary history of the ovule and in particular of the integumentary structures. The author suggests that the most primitive type appears in *Physostoma*, where the units constituting the integument are most clearly evident. Progressing upward in the plant series these units become less and less clearly recognizable. The double integument, which makes its first appearance in the Gnetales and which occurs in the angiosperms, is discussed, and several suggestions to account for its origin are brought forward. The author concludes that the integuments of pteridosperms, gymnosperms, and (probably) angiosperms are homologous structures. The integument of these forms bears no relation to the indusium of ferns.—J. C. Th. Uphof.

2009. HALL, HARVEY MONROE, AND THOMAS HARPER GOODSPEED. A rubber plant survey of northwestern North America. Univ. California Publ. Bot. 7: 159-278. Pl. 18-20. 8 fig. 1919.—See Bot. Absts. 8, Entries 2010, 2011, 2248.

2010. HALL, HARVEY MONROE, AND THOMAS HARPER GOODSPEED. Chrysil, a new rubber from *Chrysothamnus nauseosus*. [Part II of: HALL, H. M., AND T. H. GOODSPEED. A rubber plant survey of northwestern North America.] Univ. California Publ. Bot. 7: 183-264. Pl. 18-20, 6 fig. 1919.—The present paper undertakes to deal with "Chrysil," the rubber prepared

from any form of *Chrysothamnus nauseosus*: Its nature and properties; the distribution and habitats of the various forms of the plant producing it; the amounts of Chrysil available in western North America as estimated by districts; microscopical methods and chemical analysis as methods for detecting the presence of rubber and determining its amount; the results of the application of these methods in each variety of the species; distribution of rubber in the plant; factors influencing rubber content; methods of harvesting; possibilities of *C. nauseosus* as a cultivated plant and its cultural requirements. Primarily this is a study of the anatomy and histology of the varieties of the species mentioned in its various districts, with certain reference to the possibilities of Chrysil being utilized, especially in times of rubber scarcity.—W. A. Setchell.

2011. HALL, HARVEY MONROE, AND THOMAS HARPER GOODSPEED. The occurrence of rubber in certain West American shrubs. [Part III of: HALL H. M., AND T. H. GOODSPEED. A rubber plant survey of northwestern North America.] Univ. California Publ. Bot. 7: 265-278. 1919.—The present paper deals with the following: I, *Chrysothamnus* (exclusive of *C. nauseosus*) and *Haplopappus*; II, regional distribution of rubber in *Haplopappus*; III, species in which no rubber is found.—W. A. Setchell.

2012. HARRIS, J. ARTHUR, EDMUND W. SINNOTT, JOHN Y. PENNYPACKER, AND G. B. DURHAM. The vascular anatomy of dimerous and trimerous seedlings of *Phaseolus vulgaris*. Amer. Jour. Bot. 8: 63-102. 23 fig. 1921.—The gross vascular anatomy of normal ("dimerous") bean seedlings and of abnormal "trimerous" forms (with 3 cotyledons and 3 primordial leaves) were studied descriptively and biometrically. In the typical condition of the normal seedling the root is tetrarch, there are 8 bundles in the hypocotyl, 2 strands depart for each cotyledon and the remaining bundles produce 12 strands in the epicotyl. In the typical trimerous seedling the root is hexarch, there are 12 bundles in the hypocotyl, 2 strands depart to each cotyledon and there are from 14 to 18 strands in the epicotyl. Additional, or "intercalary," bundles appear in the hypocotyl of both types, but more often in normal seedlings. Bundle number in both types showed considerable variation, and the degree of variability differed with the seedling type and the region of the plant. Biometrical constants for the mean, standard deviation, and coefficient of variability for bundle number were determined for the various types of bundles and for the different regions of both seedling types. The variability in number of root poles is higher in trimerous than in dimerous seedlings. Intercalary bundles are highly variable in both types. In the hypocotyl, bundle number is far more variable in dimerous than in trimerous seedlings, but in the epicotyl just the reverse is true. Explanations of these differences are offered, based on a study of the general and comparative morphology of the plants in question. The authors emphasize "the importance of the use of both biometric and comparative methods to supplement each other in any attack upon the problems of general morphology or of morphogenesis."—E. W. Sinnott.

2013. KONDO, M. Ueber die in der Landwirtschaft Japans gebrauchten Samen. [Seeds used in Japanese agriculture.] Ber. Ohara Inst. Landw. Forsch. 1: 399-450. 16 fig. 1919.—A continuation of descriptions already published (see Bot. Absts. 5, Entry 37) dealing with certain morphological characters of seeds and seedlings.—The present article describes seeds of the following plants: *Allium fistulosum*, *A. odorum*, *A. cepa*, *A. porrum*, *Daucus Carota*, *Cryptotaenia canadensis* var. *japonica*, *Apium graveolens*, *Petroselinum sativum*, *Arctium lappa*, *Lactuca sativa*, *Chrysanthemum coronarium*, *C. cinerariifolium*, and *C. roseum*.—H. S. Reed.

2014. MARLOTH, R. Notes on the function of the staminal and staminodal glands in the flowers of *Adenandra*. Ann. Bolus Herb. 3: 38-39. Pl. 1., fig. A. 1920.—The flower possesses 5 perfect stamens and, alternating with them, 5 sterile staminodes. Each of these organs bears a gland at its apex which secretes a viscid fluid. The secretion is a kind of balsam. The flowers are strongly protandrous. When the bud opens the staminodes connive toward the center of the flower, their glands being viscid; the stamens, on the other hand, stand erect outside the staminodes, the anthers being still closed and the apical glands erect and dry.

The viscid fluid can apparently serve only one purpose, to act as an adhesive by means of which the pollen is firmly attached to the mouth parts of the visiting insects as they force their heads in between the stamens and staminodes to reach the honey in the base of the flower. The complicated movements during anthesis are evidently the means of securing cross pollination.—*E. P. Phillips.*

2015. VUILLEMIN, PAUL. L'inflorescence de *Fuchsia coccinea*. [The inflorescence of *Fuchsia coccinea*.] Compt. Rend. Acad. Sci. Paris 171: 1194–1196. Fig. 1–15. 1920.—A teretological study of variations in symmetry, fusion of parts, and number of parts of the flowers of this species.—*C. H. Farr.*

MORPHOLOGY AND TAXONOMY OF ALGAE

E. N. TRANSEAU, *Editor*

2016. DIXON, ANNIE. Exhibition of fresh-water Protozoa, June 5th. Ann. Rept. and Trans. Manchester Microsc. Soc. 1919: 61, 62. 1920.—A list and discussion of forms exhibited at the June, 1919, meeting of the Manchester Microscopical Society. Among the forms noted are *Volvox globator*, *Pandorina morum*, *Phacus triqueter*, and 2 species of *Euglena*.—*C. E. Allen.*

2017. DIXON, ANNIE. Protozoa. Report on gatherings from a pond at Lawnhurst, Didsbury, from 14th March to 12th Sept., 1918. Ann. Rept. and Trans. Manchester Microsc. Soc. 1919: 74–81. 1920.—Flagellata and Dinoflagellata are included among the species listed.—*C. E. Allen.*

2018. DIXON, ANNIE, W. LEACH, H. BENDORF, AND J. G. KITCHEN. Ramble to Pounds-wick and Northenden, May 24th, 1919. Ann. Rept. and Trans. Manchester Microsc. Soc. 1919: 62, 63. 1920.—The list of species observed includes Myxophyceae, Chlorophyceae, Bacillarieae, Bryophyta, and (under Protozoa) several Flagellata and Dinoflagellata.—*C. E. Allen.*

2019. LEACH, W. Ramble round Northenden, July 26th, 1919. Ann. Rept. and Trans. Manchester Microsc. Soc. 1919: 63. 1920.—Several Flagellata and Dinoflagellata are included in the list of Protozoa observed.—*C. E. Allen.*

2020. LUCAS, R. Protozoa. Arch. Naturgesch. 80 B: 221–420. 1914 [1920].—A report of the literature which appeared during 1913 dealing with the Protozoa, including flagellates and dinoflagellates. A list of works arranged alphabetically under authors' names is followed by a résumé according to subject, and finally by a taxonomic summary.—*C. E. Allen.*

2021. MARUKAWA, H. Plankton list and some new species of Copepoda from the northern waters of Japan. Bull. Inst. Oceanograph. Monaco 384. 15 p., pl. 1–4 and map. 1921.—A list of 87 phytoplankton species collected in 1915–1916 in the Japan and Okhotsk seas and in the northern Pacific Ocean. The name, date, locality, and local distribution are given, in tabular form.—*T. C. Frye.*

2022. OKAMURA, KINTARO, KEISUKE ONDA, AND MICHITARO HIGASHI. Preliminary notes on the development of the carpospores of *Porphyra tenera* Kjellm. Bot. Mag. Tôkyô 34: 131–135. Pl. 3. 1920.—Carpospores were grown both in normal sea water and in the same diluted and enriched with calcium phosphate and NaNO_3 up to a specific gravity of 1.020. In both cases the carpospores put out rhizoidal outgrowths, shorter in the enriched solution, which produced frond-like growths, in no instance did the authors observe the development of gametes in the manner reported by YENDO (see Bot. Absts. 3, Entry 2464). They suggest possibility that the hypothetical gametes may have belonged to a Chytridinean fungus parasite.—*Leonas L. Burlingame.*

2023. SIMONS, HELLMUTH. Eine saprophytische Oscillarie im Darm des Meerschwein-chens. [A saprophytic Oscillatoria in the intestine of the guinea pig.] Centralbl. Bakt. II. Abt. 50: 356-367. 1920.—The author, while searching for *Trichomonas* in the caecum of guinea pigs, accidentally discovered an alga which after careful study was found to be an *Oscillaria*. Botanically the important point of interest is the nutrition of this alga which, living in total darkness, has become colorless and can no longer assimilate CO₂. It is probable that nutrition takes place purely through diffusion of organic materials in solution. The author, a zoologist, calls on the botanists for further investigations.—Anthony Berg.

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

ALEXANDER W. EVANS, *Editor*

(See also in this issue Entries 1686, 1688, 1721, 1788, 2018, 2199, 2230, 2259)

2024. BRITTON, NATHANIEL LORD. *Flora of Bermuda* (illustrated). 8vo., 586 p., 1 pl., 519 fig. Charles Scribner's Sons: New York, 1918.—See Bot. Absts. 8, Entry 687.

2025. BRITTON, N. L., AND C. F. MILLSPAUGH. *The Bahama Flora*. Roy. 8 vo., viii + 695p. Published by the authors: New York, 1920.—See Bot. Absts. 7, Entry 1429.

2026. BURNHAM, STEWART H. *The mosses of the Lake George Flora*. Bryologist 23: 17-26. 1920.—See Bot. Absts. 8, Entry 118.

2027. CASARES-GIL, A. *Flora Iberica. Briófitas, primera parte. Hepáticas*. [Flora of Iberia. Bryophytes, first part. Hepaticae.] 8 vo., 775 p., 4 pl., 399 fig. Mus. Nacion. Cien. Nat. Madrid, 1919.—Aside from lists and short treatments in general descriptive works there has hitherto been no publication of much value to the student of the hepatics of Spain and Portugal. The present work fully supplies this need. The general introduction is followed by a detailed discussion of numerous morphological topics and by an account of the ecology and geographical distribution of the Hepaticae, in which emphasis is laid on their relation to substratum, humidity, latitude, and temperature. In the taxonomic portion of the volume, which occupies nearly 600 pages, 329 species are described and figured or at least critically discussed, many of these species being still unknown on the Iberian Peninsula. The book in fact is a manual of the hepatics of all southwestern Europe. In classification and nomenclature SCHIFFNER's treatment in the Engler and Prantl Pflanzenfamilien is usually followed, but the author has found it advisable to propose the following new specific combinations: *Calycularia Flotowiana* (Nees), *Haplozia Muelleriana* (Schiffn.), *Haplozia parvica* (Schiffn.), and *Haplozia subelliptica* (Lindb.).—O. E. Jennings.

2028. DIXON, H. N. *New and interesting South African mosses*. Trans. Roy. Soc. South Africa 8: 179-224. Pl. 11, 12. 1920.—A long series of South African mosses is enumerated, most of which were collected by H. A. WAGER, T. R. SIM, J. HENDERSON, D. B. HENDERSON, or M. HENDERSON. Each species is accompanied by full data regarding localities and, in many cases, by critical notes. In several instances the identity of South African species with those occurring in north temperate regions is established, and keys to the South African species are given under *Bryum* and *Lindbergia*. The following new species are described and figured, Dixon being the authority except where otherwise noted: *Brachythecium afro-albicans*, *B. pinnatum*, *Bryum pumili-roseum*, *Dicranella Symonsii*, *Didymodon afro-rubellus* Broth. & Wager, *D. Pottsii*, *Ditrichum spirale*, *Entodon cymbifolius* Wager & Dixon, *Erpodium distichum* Wager & Dixon, *E. transvaaliense* Broth. & Wager, *Fissidens papillifolius*, *Glyphomitrium marginatum* Wager & Dixon, *Gymnostomum Bewsii* Sim, *Isopterygium brachycarpum*, *Lindbergia viridis*, *Microthamnium ctenidioides*, *Plagiothecium Hendersonii*, *Psilopilum afro-laevigatum*, *Ps. Wageri* Broth., *Sciaromium capense*, *Tortula trachyneura*, and *Zygodon Simii*. The following new specific combinations are likewise made: *Anomobryum promontorii* (C. M.), *Brachymerium campylotrichum* (C. M.), and *Gymnostomum gracile* (Wager).—E. M. Doidge.

2029. DUTTON, D. LEWIS. *Buxbaumia indusiata* Brid., from Brandon, Vermont. *Bryologist* 24: 8. 1921.

2030. ELLEN, SISTER M. The germination of the spores of *Conocephalum conicum*. *Amer. Jour. Bot.* 7: 458-464. Pl. 34, 35. 1920.—In this species spores are well developed before September first (in Wisconsin) and during the fall cell divisions take place within them, 6 or 8 cells being produced within the spore wall. Winter is passed in this stage. In the spring, cell divisions proceed rapidly until each sporeling develops into a nearly spherical mass of from 30 to 40 cells, provided with chlorophyll and starch. The stalks of the carpocephala now lengthen rapidly; the setae elongate, thrusting the capsules through the calyptra; the capsule walls rupture, and the sporelings are dispersed. Sporelings collected in the fall and sown will develop. By bringing the plants or sporelings indoors and thus subjecting them to artificial conditions the normal developmental stages may be altered somewhat.—*E. W. Sinnott.*

2031. FAMILLER, I. Einige kritische Bemerkungen zu J. Röhl. Die Thüringer Torfmoose und Laubmoose und ihre geographische Verbreitung. [Critical remarks on J. Röhl's Thuringian mosses and their geographical distribution.] *Krypt. Forsch. Bayerische Bot. Ges.* 3: 187-188. 1918.—See *Bot. Absts.* 8, Entry 123.

2032. FLEISCHER, M. [Rev. of: AMANN, J., ET C. MEYLAN. *Flore des mousses de la Suisse. (Moss flora of Switzerland.)* Geneva, 1918 (see *Bot. Absts.* 4, Entry 1032).] *Hedwigia* 61: (Beiblatt) 34, 35. 1919.—The reviewer criticizes the non-use of Latin in describing new species and enumerates several generic names which he considers untenable. He likewise thinks that the authors should have adhered less to the old Schimperian classification and have made use of the more natural classification given in *Die Natürlichen Pflanzenfamilien* of Engler and Prantl.—*A. W. Evans.*

2033. FRYE, T. C. Notes on useful and harmful mosses. *Bryologist* 23: 71. 1920.—See *Bot. Absts.* 7, Entry 1513.

2034. GAGER, C. STUART. *Heredity and evolution in plants.* xv + 265 p., 112 fig. P. Blakiston's Son & Co.: Philadelphia, 1920.—See *Bot. Absts.* 7, Entry 1610.

2035. HOLZINGER, J. M. [Rev. of: DIXON, H. N. *New and interesting South African mosses.* *Trans. Roy. Soc. South Africa* 8: 179-224. Pl. 11, 12. 1920 (see *Bot. Absts.* 8, Entry 2028).] *Bryologist* 23: 91-92. 1920.—The reviewer commends the author's careful tracing of the identity of African species with those of temperate regions.—*E. B. Chamberlain.*

2036. JÄGGLI, MARIO. Contributo alla briologia ticinese. [Contribution to the bryology of Ticino.] *Boll. Soc. Ticinese Sci. Nat.* 1919: 27-44. 1919.—The author gives a list of 181 mosses from the canton of Ticino, Switzerland, based on collections which he made in 1902 and later. Full data regarding stations are given under each species, and critical notes are occasionally added. Of the species listed *Fissidens Curnowii* Mitt. and *Cylindrothecium cladorrhizans* (Hedw.) Schimp. are new to Switzerland, and 16 other species or varieties are new to Ticino.—*A. W. Evans.*

2037. JÄGGLI, MARIO. Una nota inedita di Alberto Franzoni sulle epatiche ticinesi. [An unpublished note by Alberto Franzoni on the hepaticae of Ticino.] *Boll. Soc. Ticinese Sci. Nat.* 1919: 19-26. 1919.—The author publishes a list of the Hepaticae known from the canton of Ticino, Switzerland. This list is based largely on a manuscript of FRANZONI bearing the date 1869, and for most of the records there are actual specimens in the Franzoni herbarium, now preserved in the museum at Locarno. The species enumerated number 64, of which 48 are Jungermanniales and 16 Marchantiales. From a historical standpoint the most interesting species listed is *Scapania Franzoniana* DeNot., here reduced to synonymy by MEYLAN and included under *S. subalpina* var. *purpurascens* Bryhn.—*A. W. Evans.*

2038. KAALAAS, B. Einige Bryophyten aus dem südlichsten Sibirien und dem Urjankai-lande. [Bryophytes from the southernmost part of Siberia and the Urjankai country.] Skrifter K. Norske Videnskab. Selskab [Trondhjem] 1918: 1-13. Pl. 1, 2, 2 fig. 1919.—The collection studied by the author was made in 1914 by H. PRINTZ, botanist of the Norwegian Scientific Expedition to southern Siberia and the Urjankai country. It consists of fragmentary specimens growing in tufts of *Carex* or on the soil adherent to the roots of other vascular plants. The species listed include 8 hepatics, 7 peat mosses, and 57 true mosses. Two of the latter, *Brachythecium abakanense* and *Rhytidiadelphus Printzii*, are described as new and illustrated on the 2 plates, which were drawn by Printz.—A. W. Evans.

2039. KASHYAP, S. R. Distribution of liverworts in the western Himalayas. Jour. Indian Bot. 1: 149-157. 1920.—See Bot. Absts. 8, Entry 130.

2040. LORENZ, ANNIE. Some hepaticae from Matinicus Island, Maine. Bryologist 23: 1-3. 1920.—See Bot. Absts. 8, Entry 133.

2041. LOWE, RACHEL L. *Rhacomitrium sudeticum*, a moss new to Worcester County, Massachusetts. Bryologist 23: 4-5. 1920.—See Bot. Absts. 8, Entry 134.

2042. NEGRI, G. Su un musco cavernicolo crescente nell' oscurità assoluta. [A moss growing in absolute darkness.] Atti R. Accad. Lincei Roma Rendiconti Cl. Sci. Fis. Mat. e Nat. V, 29: 159-162. 1920.—See Bot. Absts. 7, Entry 2170.

2043. STANDLEY, PAUL C. *Sphagnum* in Glacier National Park, Montana. Bryologist 23: 5-6. 1920.—See Bot. Absts. 8, Entry 142.

MORPHOLOGY AND TAXONOMY OF FUNGI, LICHENS, BACTERIA, AND MYXOMYCETES

H. M. FITZPATRICK, *Editor*

(See also in this issue Entries 1827, 1837, 2194, and entries in the section Pathology)

FUNGI

2044. ANONYMOUS. [Rev. of: GUILLIERMOND, A. The yeasts. Translated and revised by F. W. TANNER. xix + 424 p., 163 fig. Chapman & Hall, Ltd.: London, 1920 (see Bot. Absts. 8, Entry 2057).] Sci. Prog. [London] 15: 500. 1921.

2045. ARTHUR, JOSEPH CHARLES. Aecidiaceae (Uredinales). North Amer. Flora 7: 269-336. Dec. 24, 1920; 7: 337-404. Dec. 31, 1920; 7: 405-480. Feb. 8, 1921.—In continuation of his taxonomic treatment of the North American rusts the author in Part 4 presents a key to the 269 recognized American species of *Dicæoma* and gives a complete treatment of 88 species. For each of these is given complete synonymy, descriptions of the several stages and the known host plants on which each occurs. Exsiccatae are cited, and the distribution and the type locality for each species is given together with the published illustrations. For those species that occur on Poaceae FRED DENTON FROMME is named as collaborator. A total of 44 new species or new combinations is given. The latter in most cases represent transfers from *Puccinia*, *Aecidium*, *Uredo*, and *Roestelia*. Two transfers are made from *Diorchidium* and one from *Uromyces*.—In Part 5 the treatment of *Dicæoma* is continued with the presentation of descriptions of 112 species. For species on *Carex* the author has collaborated with FRANK DUNN KERN. A total of 63 new species or new combinations is given, the latter representing transfers chiefly from *Puccinia*, *Aecidium*, *Uredo*, and *Caecoma*. One transfer is made from *Rostrupia*.—In Part 6 *Dicæoma* is completed and HERBERT SPENCER JACKSON is named as collaborator for the species which occur on Carduaceae. In this part is given a similar treatment of the genus *Pucciniola* with 25 species and *Allodus*

with 49 species. In the latter genus CLAYTON ROBERTS ORTON is named as collaborator for all the species. The genus *Klebahnia* having 8 species is begun but only 6 of them are completely treated. Of new species and new combinations there are in this part 51 for *Dicaeoma*, 25 for *Pucciniola*, 10 for *Allodus*, and 5 for *Klebahnia*. The new combinations in *Dicaeoma* represent transfers from *Puccinia*, *Uredo*, and *Aecidium*, those in *Pucciniola* transfers from *Aecidium*, *Uromyces* and *Puccinia*, those in *Allodus* transfers from *Puccinia* and *Aecidium*, and those in *Klebahnia* transfers from *Uromyces*.—The material here presented is the first thorough taxonomic work on these groups in North America and it should be examined by every student interested in the rusts.—E. B. Payson.

2046. ARTHUR, JOSEPH CHARLES. New species of Uredineae-XIII. Bull. Torrey Bot. Club 48: 31-42. 1921.—*Puccinia pacifica* Blasdale, *P. irrequisita* Jackson, *Uromyces coördinatus*, *Ravenelia havanensis*, and *Lipospora tucsonensis* are described as new species. *Puccinia additica* Jackson & Holway nom. nov. for *P. Coreopsidis* Jackson & Holway, *P. opposita* (Orton) comb. nov., *P. Erigerinae* (Orton) comb. nov., *Polythelis suffusca* (Holway) comb. nov., and *Gallowaya pinicola* nom. nov. for *G. Pini* Arth. are given and the following new genera are made: *Lipospora* and *Teleutospora* Arthur & Bisby, the latter being for 3 species of *Uromyces* (*U. Rudbeckiae* Orth. & Holw., *U. Solidaginis* Niessel, and *U. bauhinicola* Arth.). *Micropuccinia* Rostrup is discussed and to it are referred a number of species included by Rostrup in 1902 as well as those short-cycle forms placed by him in *Dasyscypha*. Ninety species are here referred to *Micropuccinia*, and are to be credited to Arthur and Jackson.—P. A. Munz.

2047. BACHMANN, E. Der Thallus saxikoler Pilze: *Phaeospora propria* (Arn.) und *Nectria indigens* (Arn.). [The thallus of the saxicolous fungi *Phaeospora propria* (Arn.) and *Nectria indigens* (Arn.).] Centralbl. Bakt. II Abt. 50: 45-54. Fig. 1-11. 1920.—By the term saxicolous fungi, the author designates fungi which grow and fruit on rock apparently free from organic matter. The author has previously shown in the case of *Pharcidium lichenum* (Arn.) and *Didymolla Lettaniana* Keiszl. that such fungi exist. The present investigations show that *Phaeospora propria* (Arn.) is an endolithic lime fungus with a parasymbiotic mode of life. It probably lives with vigorously developed and fruiting lichen beds as a parasymbiont. Most significant, however, is the fact that the fungus has the power of penetrating deeply into the lime not only by means of the lichen hyphae but also by means of true fungus hyphae. If the dissolving of the lime is accomplished by means of CO₂ produced in the respiration of the fungus, it would appear that there are 2 types of saxicolous fungi, one with an accentuated respiration (endolithic) and the other with normal respiration (exolithic). *Nectria indigens* is an exolithic lime fungus which grows parasymbiotically with several lichen complexes but in no way forms a truly combined lichen thallus. In its latest stages, however, the fungus lives as a true parasite upon the engulfed lichen complex. The lichen seems to be the only visible source of carbon for this saxicolous fungus.—Anthony Berg.

2048. BAMBEKE, CHAS. VAN. Recherches sur certains elements du mycélium d'*Ithyphallus impudicus* (L.). [Certain elements of the mycelium of *I. impudicus*.] Bull. Acad. Roy. Belgique Cl. Sci. 1914: 280-286. 2 pl. 1914 [1919].—The author concerns himself here with structures which from their shape and certain peculiarities he calls "glomézules mycéliens." They occur in the cortex of the rhizomorphs. After describing their form and structure the author states that they do not constitute organs of propagation comparable to the bulbils and tubercles of the phanerogams.—Henri Michéels.

2049. BOEDYN, K., UND C. VAN OVEREEM. Mycologische Mitteilungen. Serie I. Ascomyceten. Erstes Stück. Über das Vorkommen von Carotinkristallen in zwei neuen Pezizaarten. [Mycological notes. Series I. Ascomycetes. First part. On the occurrence of carotin crystals in two new species of Peziza.] Hedwigia 59 307-312. Pl. 2. 1918.—Two species of the Pezizales are described as new, *Humaria carota* and *Ascophanus fimicola*. Carotin in the form of prominent crystals was found in the ends of the paraphyses and in the cells of the hypothecium.—H. M. Fitzpatrick.

2050. BOSE, S. R. Descriptions of fungi in Bengal, Series II, in continuation of Proc. Indian Assoc. Cultivation Sci. Vol. IV Part IV (Agaricaceae and Polyporaceae). Proc. Sci. Convention Indian Assoc. Cultivation Sci. 1918: 136-143. Pl. 1-13. 1920.—The following species collected in Calcutta and its suburbs are described and figured (the figures show the fruiting body above, below, and in section): *Lepiota mastoidens*, *Coprinus niveus*, *Volvaria tirastins*, *Lenzites betulina*, *Polyporus gilvus*, *P. sp.*, *Polystictus versicolor*, *P. leoninus*, *P. tabacinus*, *Fomes annularis*, *F. (Ganoderma) lucidus*, *Trametes cingulatus*, *Daedalea Hobsoni*. Most of the polypores reported were found on dead wood. The paper constitutes part II of Bengal Polyporaceae, which is being published serially.—S. R. Bose.

2051. COSTANTIN, JULIEN, ET LEÓN DUFUR. Sur la biologie du *Goodyera repens*. [Concerning the biology of *Goodyera repens*.] Rev. Gén. Bot. 32: 529-533. 1920.—A fungus isolated in a large proportion of the trials is regarded as a symbiont and is named *Rhizoctonia Goodyera repentis*.—J. C. Gilman.

2052. DIETEL, P. Über die Aecidiumform von *Uromyces Genistae tinctoriae*. [Concerning the aecial state of *Uromyces Genistae tinctoriae*.] Ann. Mycol. 17: 103-109. 1919 [1920].—Observations made by the author on a field association of an Aecidium on *Euphorbia cyparissias* with *Uromyces Genistae tinctoriae* (Pers.) Wint. on *Genista tinctoria* are recorded. These observations strongly indicated a genetic connection between the two forms and an isolated field culture was accordingly made which resulted in the development of uredinia on *Genista tinctoria* following exposure to infection by aeciospores from *Euphorbia cyparissias*. The aecial state belongs to the collective species *Aecidium Euphorbiae* Gmel. which causes deformation of the host. Considerable variation exists in the character of the deformation in this species and the author describes this in some detail in comparison with a description of the case observed. There appears to be no correlation between the type of deformation in the aecial host and the different species of *Uromyces* with which this aecidium has been previously connected.—H. S. Jackson.

2053. DOIDGE, ETHEL M. South African Microthyriaceae. Trans. Roy. Soc. South Africa 8: 235-282. Pl. 13-19. 1920.—This is a systematic account of the South African Microthyriaceae as represented in the Union National Herbarium. Fifty species are included belonging to the following genera: *Microthyrium* (1), *Seynesia* (1), *Morenoina* (1), *Englerulaster* (3), *Parasterina* (3), *Asterina* (30), *Asterinella* (4), *Lembosia* (3), *Echidnodes* (1), *Morenoella* (1), *Echidnodella* (1), *Amazonia* (1). Theissen records only 6 species of *Asterina* from Africa. The following new species are described: *A. clausenicola*, *A. delicata*, *A. Excoecariae*, *A. ferruginosa*, *A. Hendersoni*, *A. natalensis*, *A. Peglerae*, *A. polythyria*, *A. raripoda*, *A. reticulata*, *A. rhamnicola*, *A. robusta*, *A. Trichiliae*, *A. uncinata*, *A. undulata*, *Parasterina implicata*, *P. rigida*, *Asterinella Acokantherae*, *A. Burchelliae*, *A. lembosoides*, *A. Woodiana*, *Englerulaster Popowiae*, *Lembosia natalensis*, *L. radiata*, *Echidnodes rhoinea*, *Microthyrium maculicolum*, *Echidnodella Hypolepides*, *Morenoella Oxyanthae*, *Morenoina africana*. A host index is appended.—E. M. Doidge.

2054. ERIKSSON, JAKOB. Die Hauptergebnisse einer Untersuchung über den Wirtswechsel und die Spezialisierung von *Puccinia Caricis* Reb. [Principal results of investigations regarding the alternation of hosts and the specialization of *Puccinia Caricis* Reb.] Centralbl. Bakt. II Abt. 50: 441-443. 1920.—A preliminary report of culture studies with *Puccinia Caricis* giving an analytical grouping of the results based on the experiments of the author and those of H. KLEBAHN. Numerous observations point to the conclusion that there are biological forms in all groups studied.—Anthony Berg.

2055. FOËX, E. Sur l'histoire du développement du *Peronospora spinaciae* (Grew.) Laub. [Rev. of: ERIKSSON, J. On the development of *Peronospora spinaciae* (Grew.) Laub. Ark. Bot. 15¹⁵: 1-25. Pl. 4, 3 fig. 1918 (see Bot. Absts. 3, Entry 356).] Rev. Gén. Bot. 32: 552-560. Pl. 14, 15. 1920.—A technical review of Eriksson's work describing the life-cycle of the fungus, including mycoplasma phase, oospores, and oospore germination.—J. C. Gilman.

2056. FRIEDERICH, K. Über die Pleophagie des Insektenpilzes *Metarrhizium anisopliae* (Metsch.) Sor. [On the parasitism of the insectivorous fungus *Metarrhizium anisopliae* (Metsch.) Sor.] *Centralbl. Bakt.* II Abt. 50: 335-356. Pl. 1 (colored). 1920.—The fungus growth is pictured in colors. The results of a number of experiments in which various hosts were used are recorded. An extensive bibliography is appended.—H. M. Fitzpatrick.

2057. GUILLIERMOND, ALEXANDRE. The yeasts. Translated and revised in collaboration with the original author by F. W. TANNER. xix + 424 p., 163 fig. John Wiley and Sons, Inc.: New York; Chapman and Hall, Ltd.: London, 1920.—This English edition is based on Guilliermond's "Les Levures," published in 1912 as a volume of the *Encyclopédie Scientifique*. It is not merely a translation, but constitutes a revision in the light of recent literature. The yeasts are treated from the standpoints of morphology, cytology, physiology, phylogeny, and taxonomy. Methods for use in the characterization and identification of species are given, as well as methods of culture and isolation. In the taxonomic treatment the group is subdivided into *Saccharomycetes* and *Non-Saccharomycetes*, the latter group embracing such genera as *Torula*, *Pseudosaccharomyces*, *Cryptococcus*, and *Mycoderma*. Fungi related to the yeasts are also discussed, e. g., *Endomyces albicans*, *Monilia candida*, *Pseudomeliola albomarginata*, and *Parendomyces pulmonalis*. Many of the forms are figured. An extensive bibliography is appended. A large number of pathogenic yeasts are described. An attempt has been made to present in a single book the essential information available concerning the whole group of yeasts and yeast-like organisms having in mind every point of view. Although several treatises have previously appeared dealing with yeasts in relation to fermentation this is the first book to cover the broader field, and it fills a need long felt for a comprehensive reference work on this subject.—H. M. Fitzpatrick.

2058. HENRICI, A. T., AND E. L. GARDNER. The acid fast actinomycetes with a report of a case from which a new species was isolated. *Jour. Infect. Diseases* 28: 232-248. 1921.—A new species of *Actinomyces*, *A. gypsoides*, which is acid fast and pathogenic is described. It is characterized by strong proteolytic activities, the darkening of media containing peptone, and the possession of chalky-white aerial mycelium.—Selman A. Waksman.

2059. HERRMANN, EMIL. Bestimmungstabelle zu den Täublingen. [Key to the Russulas.] *Hedwigia* 60: 331-341. 1919.—A key to the species of the genus *Russula* based primarily on color and taste. Almost 100 species are included.—H. M. Fitzpatrick.

2060. HIGGINS, B. B. Morphology and life history of some ascomycetes with special reference to the presence and function of spermatia. *Amer. Jour. Bot.* 7: 435-444. 2 fig., 1 pl. 1920.—Spermatia or similar structures have been observed in various families of ascomycetes. As an example of a species which produces spermatia, the author outlines the life history of *Mycosphaerella Bolleana* n. sp., an ascomycete parasitic on the leaves of the fig. He presents a diagnosis of the species and describes in detail the production of conidia, spermatia, and asci. All attempts to germinate the spermatia failed. Artificial infections with ascospores produced conidia on the leaves of the fig.—E. W. Sinnott.

2061. HÖHNEL, FRANZ VON. Mycologische Fragmente. [Mycological fragments.] *Ann. Mycol.* 17: 114-133. 1919 [1920].—*Tricholoma tenuiceps* Cooke & Massee is transferred to *Russula*. *Myocopron Pandani*, on dry leaves of *Pandanus* sp., and *Phragmothyrrium fimbriatum*, on leaves of *Ardisia fuliginosa*, are described as new; the latter is compared with *P. corruscans* (Rehm) Th. *Meliola rubicola* P. Henn. is considered identical with *Sphaeria calostroma* Desm. The structure of the perithecial wall and appendages is described and the relationship of this genus, as illustrated by this species, with other groups is discussed. *Asterella oliacea* v. H. is transferred to *Microthyriella* v. H. and the relationship of the latter genus with *Schizothyrium* discussed. *Pseudonectria Metzgeriae* Ade. & v. H., found on upper surface of thallus of *Metzgeria furcata*, is described as new. *Sphaeria bryophila* Roberge is thought to be identical with *S. muscivora* Berk. & Br. and the new combination *Nectria muscivora* (Berk.

& Br.) v. H. is proposed; a full description is furnished. The author concludes from an examination of original material that *N. Hippocastani* Otth. (*Calonectria Hippocastani* (Otth.) Sacc.) is based on a mixture of *Nitschkia cupularis* (Pers.) Kant. and *Melanomma Pulvis pyrius* (Pers.) Fckl. After a study of original material the author also concludes that *Miyakeamyces Bambusae* Hara, originally described as a new genus and species, is not parasitic on *Phyllachora Phyllostachydis* Hara, but is parasitic directly on the leaves of *Phyllostachys bambusoides*; it is here considered one of the Nectriaceae and transferred to the genus *Calonectria*. A full redescription is given. *Broomella Lagerheimia* Patouill. is considered a related species and is also transferred to *Calonectria*. For the benefit of those who accept the genus *Puttemansia* P. Henn. as distinct from *Calonectria*, new combinations of these 2 species are also provided in that genus. *Neopeckia episphaeria* occurring on old stromata of *Hypoxylon rubiginosum* is described as new. A new genus of the Melanommeae, *Melanopsammella*, based on *Eriosphaeria inaequalis* Grove, is proposed with *Gonythyricum* as the conidial stage. *Sphaeria helicicola* Desm. is redescribed from original material and transferred to *Lophiotrema*. The opinion is expressed that *Sphaeria Hederæ* Sow. is probably identical with *S. helicicola*. *Othia Winteri* Rehm is thought to be only a poorly developed form of *Cucurbitaria protracta* Fckl. *Othia Rubi* occurring on canes of *Rubus Idaeus* and *R. caesius* is described as a new species based on specimens distributed in Roumeguere's Fungi Gall. Exc. Nos. 1585 and 1596 as *Melanopsamma mendax* S. & R. and *M. ruborum* (Lib.) respectively. *Uleomyces cinnabarinus*, parasitic on the stroma of *Venturia aggregata* Wint., is described as a new species. The latter is redescribed and transferred to *Antennularia* (*Caleroa*). The opinion is expressed that *Antennularia*, *Montagnina*, and *Parodiella* are related genera and best placed in the Cucurbitariaceae. *Botryostroma inaequale* (W.) v. H. is considered to be dothidiaceous and related to *Munkiodothis*. A description of *Didymella superflua* (Awld.) Sacc. drawn from authentic material is given, together with a historical review of the species and a discussion of its relationships and associated forms; a considerable number of specimens, including many issued in various exsiccates, were examined and a detailed discussion of these is included. *Epicoccum nigro-cinnabarinum* is described as new, based on Sydow's Mycoth. March No. 2548. The new combination *Didymella Sisymbrii* (Rehm) v. H., based on *D. superflua* var. *Sisymbrii* Rehm, is proposed and a description furnished drawn from specimens issued in Krieger F. Saxon. No. 2314 and Rehm Ascom. Exs. No. 2170. Attention is called to the necessity for a critical study of all species of the genus *Didymella* and the opinion expressed that many of the species now assigned to it belong in other genera including *Carlia*, *Didymellina*, *Metasphaeria*, *Didymosphaeria*, *Diaporthe*, etc. The taxonomic history of *Sphaeria cooperta* Desm. is reviewed and the conclusion reached that this species is properly referred to *Anistomula* v. H.; the new combination, *A. cooperta* (Desm.) v. H., is proposed. The fungus occurs on the under side of leaves of *Quercus coccifera*. A full description is given and its relationship with *Anistomula Quercus Ilidis* (Trav.) v. H. is discussed. *Leptosphaeria typharum* (Desm.) Karst. and *L. culmorum* Awld. are thought to be substratum forms of the same species. In this connection the relationship of *Leptosphaeria* de Not, *Scleroplella* v. H., and *Nodulisphaeria* Rbh. is discussed. The author does not agree with HASZLINSKY in considering *Gibbera vitis* Schulzer and *Valsa ampelina* (Fuck.) Nitschke identical with *Echusias vitis* Hasz. The latter genus is thought to be identical with *Fracchiaca* Sacc.; both genera were established in 1873. The latter name is preferred by the author and the new combination *F. vitis* (Hasz.) v. H. is proposed. Attention is called to certain errors occurring in the author's classification of the Diaporthaceae (Ber. Deutsch Bot. Ges. 25: 1917) and to certain additions to the same. These corrections and additions relate to the genera *Ophiognomonina*, *Valseutypella* v. H., *Neozimmermannia* Koorders, *Disperma* Thiess., *Cryptonectriopsis* v. H., and *Plagiostomella* v. H. *Sphaeria cryptosphaeria* Fuckel is thought to be identical with *Ditopella fusispora* de Not. *Rehmiella* Winter is considered identical with *Ditopella* de Not, and *Rehmiella alpina* Winter is transferred to the latter genus. *Sphaeria protuberans* Fuckel as represented by the specimen distributed in F. Rhen. No. 2242 is also considered identical with *Ditopella fusispora*. Additional evidence is presented to support the opinion previously published by the author that *Diaporthe* Krie-

geriana Rehm is merely a *Euporthe* form of *Diaporthe coneglanensis* Sacc. & Speg. The occurrence of *D. marginalis* Peck in Europe on branches of the green alder is recorded and a description furnished. *D. cerasina* Rehm is considered to be only a form of *Valsa* (*Leucostoma*) *cincta* Fr., and the new combination and variety *Leucostoma cincta* (Fr.) v. H. var. *cerasina* (Rehm) v. H. is proposed; *Valsa sphaerostoma* Nitschke is thought to be the same.—H. S. Jackson.

2062. KEISSLER, KARL VON. Revision der von Sauter aufgestellten Pilze (an Handen dessen Herbars). [Revision of the fungi published by Sauter (on the basis of specimens in his herbarium).] *Hedwigia* 60: 352-361. 1919.—Sauter described between 1800 and 1881 a large number of fungi, chiefly discomycetes, and since his descriptions of these are very short and often inadequate, a knowledge of the type specimens in his herbarium has been desirable. Keissler has studied these and records his observations here. Of 143 species described by Sauter, he finds practically none to be valid.—H. M. Fitzpatrick.

2063. KILLERMANN, S. Neuer Fund von *Sarcosoma globosum* (Schmidel) Rehm bei Regensburg. [New discovery of *Sarcosoma globosum* near Regensburg.] *Hedwigia* 59: 313-318. Pl. 3, 2 fig. 1918.—The rediscovery of this rare fungus is announced, and the belief is expressed that it constitutes a valid genus and species.—H. M. Fitzpatrick.

2064. KILLIAN, CHARLES. Le développement du *Dothidella Ulmi* (Duv.) Winter. [The development of *Dothidella Ulmi* (Duv.) Winter.] *Rev. Gén. Bot.* 32: 534-551. Pl. 16-19. 1920.—The development of this organism causing a leaf-spot of the elm was studied morphologically and histologically. The paper is divided into 2 parts. The 1st part contains a detailed description of the development of conidia and ascospores. The 2nd part is a discussion and comparison of the morphology of *Dothidella* and other ascomycetes and the Uredinales. The author concludes that the ascomycetes and the Uredinales had a common ancestry.—J. C. Gilman.

2065. LUYK, A. VAN. Über *Gloeosporium Tremulae* (Lib.) Pass. und *Gloeosporium Populi-albae* Desm. [Concerning *Gloeosporium Tremulae* and *G. Populi-albae*.] *Ann. Mycol.* 17: 110-113. Fig. 1. 1919 [1920].—These species of *Gloeosporium* are considered identical with *G. circinans* (Fekl.) Sacc. and agree with it in having the spores, in part, united laterally by short connecting processes into complex groups of various shapes. Based upon this character, *Titaeosporina* is proposed as a new genus of the Melanconiaceae-Hyalosporae with *T. Tremulae* (Lib.) van Luyk as the type species. A full synonymy and description is furnished. The hosts are *Populus alba*, *P. tremula*, and *P. canescens*. The genus is thought to be analogous to *Titaeospora* Bubak but differs from the latter in the absence of septation in the spores.—H. S. Jackson.

2066. ORTON, W. A. Compilation of list of new fungi. *Phytopathology* 11: 29-30. 1921.—"The British Mycological Society intends to publish the original diagnoses of the genera of fungi which have appeared since the last volume (22) of Saccardo's *Sylloge*, and to keep the list up to date by annual installments. Doctor J. Ramsbottom, general secretary of the Society, British Museum (Natural History), Cromwell Road, London, S. W. 7, has undertaken to compile this list, and would welcome separates in which new genera have been described, or assistance in any way. It is believed that the list will be valuable to all interested in mycological studies."—H. M. Fitzpatrick.

2067. OUDEMANS, C. A. J. A. *Enumeratio Systematica Fungorum*. [A systematic enumeration of fungi.] Vol. 1. cxxvi + 1230 p. Martinus Nijhoff: The Hague, 1919.—This is the 1st volume of a 5 volume set. The 4 additional volumes will appear at irregular intervals. The work constitutes a host index enumerating all fungi living as parasites on the plants of Europe. Citations to mycological literature have been added to the names of the fungi listed, thus making possible the location of the original references to the parasitism of each

fungus mentioned. The host plants are arranged according to the Engler system. Volume 1 includes all hosts belonging to the lower groups of plants up to and including the Monocotyledons, volumes 2, 3, and 4 will embrace the dicotyledons, and volume 5 will serve as an alphabetical register for the 4 preceding volumes. The fungi are arranged by families under the name of the host, the families of each of the primary subdivisions of the fungi being grouped together. The organs of the host on which the fungus occurs are also indicated. Only the flora of Europe is covered but the term "European plant" is used in its broadest sense, any plant found in the living state in Europe, whether wild or cultivated, native or introduced, being included. Although the author died in 1906 the work has been completed up to 1910 by collaborators, and the whole is published under the direction of the Hollandsche Maatschappij van Wetenschappen of Haarlem. The work represents an attempt to meet a need long-felt by mycologists for a host-index, a need hitherto very imperfectly supplied by volume 13 and succeeding volumes of Saccardo's *Sylloge Fungorum*.—H. M. Fitzpatrick.

2068. OUDEMANS, C. A. J. A. *Enumeratio Systematica Fungorum*. [A systematic enumeration of fungi.] Vol. 2. *xix* + 1069 p. Martinus Nijhoff: The Hague, 1920.—The 2nd volume of the publication discussed in the preceding entry. This volume contains hosts belonging to the 17 families of the dicotyledons—Salicaceae to Basellaceae inclusive.—H. M. Fitzpatrick.

2069. PETRAK, F. *Mycologische Notizen*. [Mycological notes.] *Ann. Mycol.* 17: 59–100. 1919 [1920].—*Phomopsis pustulata* Sacc. is transferred to *Sclerophoma*; a detailed description is given, also a comparison with *Sclerotiopsis protracta* (Sacc.) Died. and *Myxofusicoccum obtusulum* (Sacc. & Br.) Died. A *Cytospora* stage of *Valsella polyspora* Nke. is described which is considered identical with *Cytospora personata* Fr. Evidence is presented to show that *Valsella polyspora* and *V. adhaerens* Fekl. are probably merely many-spored forms of *Valsa Auerswaldii* Nke. *Dothidella ribesia* (Pers.) Theiss. and Syd. is transferred to *Phragmodothella* and a full synonymy given, with which the American species *P. Kelseyi* (Ellis & Ev.) Theiss. & Syd. (*Homostegia Kelseyi* Ellis & Ev.) is questionably included. *Phomopsis juglandina* (Fekl.) v. H. is described in full together with a *Fusicoccum*-like form which is considered an abnormal type of the *Phomopsis*. *Septoria Meliloti* (Lasch.) Sacc. (*Sphaeria Meliloti* Lasch.), *Ascochyta caulicola* Laubert, *Stagonospora carpathica* Bäum., and *S. Medicaginis* (Desm. & Rob.) v. H. are all considered to be identical with *S. compta* (Sacc.) Died., and the new combination *S. Meliloti* (Lasch.) Petrak is proposed and full synonymy given. A detailed description is given of a form of *Phomopsis ribesia* (Sacc.) Died. which is stated to be the spermatogonial form of *Diaporthe purgens* Nke. The latter is considered merely a form of *D. strumella* (Fr.) Fekl. An *Othia* on *Ligustrum* is described which is considered identical with *Othia Crataegi* Fekl.; *Diplodia ligustrina* West was collected in association with it but it is not thought to be the conidial stage since 2 species of *Didymosphaeria* were also found either of which might be the ascogenous stage of the *Diplodia*. *Phleospora Hrubyana* Sacc. on *Spiraea chamaedrifolia* is described and considered identical with *Septoria magnusiana* Allesch. In this connection the relationship and limitations of the genera *Phleospora*, *Septoria*, *Cylindrosporium*, and *Septogloeum* are discussed and the following new combinations proposed: *Phleospora platanoides* (Allesch.) Petrak (*Septoria seminalis* Sacc. var. *platanoides* Allesch.), *P. heraclei* (Lib.) Petrak (*Ascochyta heraclei* Lib.), *P. padi* (Karst.) Petrak (*Cylindrosporium padi* Karst.), *P. magnusiana* (Allesch.) Petrak (*Septoria magnusiana* Allesch.). The conclusion is reached that *Diaporthe spiculosa* (Alb. & Schw.) Nke. and *D. circumscripta* Oth. occurring on *Sambucus* spp. are identical, being merely growth forms of the same species. Likewise the 2 conidial forms assigned to these species, *Phoma sambucella* and *P. sambucina*, are the same and should be cited as *Phomopsis sambucina* (Sacc.) Trev. A new genus, *Keisslerina*, regarded as closely related to *Dothiora*, is founded on a hitherto undescribed species, *K. moravica*, occurring on dry twigs of *Evonymus europaea*; *Dothichiza evonymi* Bub. & Kab. is the conidial stage. An immature ascomycete, presumably a species of *Botryosphaeria*, is described which is considered to be the probable ascogenous stage of *Botryodiplodia Fraxini* (Lib.) Sacc., with which it was associated and of which a full description is given. *Dothiorella Fraxini* (Lib.) Sacc. is thought to be merely a young development of the same species; likewise

a fungus identified as *Fusicoccum Forsythiae* Died., occurring on branches of *Forsythia*, *Syringa*, *Ligustrum*, and *Cornus* is considered identical. A full synonymy is given but no name is applied to the ascomycete form on account of its immaturity. *Stigmatea moravica* Petrak is redescribed in detail from a recent collection of material showing unusually rich development. It is shown that the fungus belongs in the Hypocreaceae, and *Nectriella moravica* Petrak is proposed as a substitute name. A new genus, *Cytoplacosphaeria*, founded on *Placosphaeria rimosa* Out., is proposed which differs from other genera of the Sphaeriaceae in the relation of the pycnidia to the stroma. The author disagrees with von Höhnelt in considering this species the conidial stage of *Scirrhus rimosa* (Alb. & Schw.) Fekl.; it is suggested that *Diplodina arundinacea* Sacc. may possibly be identical. *Cytoporina Rubi* Died. is considered identical with *Rhabdospora ramealis* Desm. & Rob. and the new combination *Cytoporina ramealis* (Desm. & Rob.) Petrak is proposed. A detailed description is given of a *Phomopsis* which is considered to be the conidial form of *Diaporthe Winteri* Kunze and the new combination *Phomopsis Winteri* (Kunze) Petrak is proposed. *P. crataegicola* n. sp. occurring on dry twigs of *Crataegus oxyacantha* is described and thought to be a conidial stage of *Diaporthe Crataegi* Fekl. The author distinguishes the latter from *D. semimmersa* Nke. A detailed description is given of *Phoma chamaeropsis* Cooke occurring on *Chamaerops humilis* and the new combination *Phomopsis chamaeropsis* (Cooke) Petrak is proposed. The suggestion is made that *Phyllosticta magnusii* (Bomm. & Rouss.) Allesch. and *P. coccinea* (Cooke) Allesch. var. *Phoenicis* (Brun.) Allesch. are substratum forms of the same species. *Pseudopleospora* is proposed as a new genus of ascomycetes, with *P. ruthenica* n. sp., on decorated stems of *Eupatorium cannabinum*, as the type species; its relationships are uncertain, it possibly belonging near the Hypodermataceae. The author suggests that it may represent a distinct family. *Peltosphaeria Petrakiana* Rehm is redescribed and transferred to *Dothiora*; *Dothichiza falloz* Sacc. is thought to be the conidial stage. *Fusicoccum hrancense*, on dry twigs of *Ulmus campestris*, formerly confused with *Phomopsis oblonga*, is described as a new species. *Neokeissleria* is proposed as a new genus, based on *Ceriospora ribis* P. Henn. & Ploettner; a description with full synonymy is given. The relationship of this new genus with *Ceriospora* and *Melanconis* is discussed in detail. *Phomopsis phyllophila*, on dry overwintered leaves of *Trifolium repens*, is described as new. *Phomopsis pyrrhocystis*, on dry twigs of *Corylus avellana*, is also described as new and is thought to be the spermagonial form of *Diaporthe pyrrhocystis* (Berk. & Br.) Fekl., with which it was found associated. *Karstenula ligustrina* n. sp., on dry sprigs of *Ligustrum vulgare*, is described and thought to be the ascogenous stage of *Microdiplodia mamma* Allesch. *Cucurbitaria moravica* Rehm is transferred to *Karstenula*; *Microdiplodia Pruni* Died. was found in association with it. *Chaetocytostroma*, showing relationship with *Fusicoccum*, is proposed as a new genus based on an hitherto undescribed species, *C. arundinacea*. The genus differs from *Fusicoccum* in the small spores and a hairy stroma. A new genus of the Nectroidaceae, *Blennoriopsis*, is described, based on *B. moravica* n. sp., on stems of *Linaria genistifolia*. *Diaporthe abnormis* v. H. is considered identical with *D. occulta* (Fekl.) Nke. (*Calospora occulta* Fekl.). The latter is made the basis of a proposed new genus, *Macrodiaporthe*, which is stated to differ from *Diaporthe* in that the stroma develops only above with the perithecia free below, the walls of the latter being thick and leathery and the spores and asci very large. A full synonymy is given. The author agrees with von Höhnelt in considering *Diaporthe oncostoma* and *D. fasciculata* on *Robinia* identical, and accepts his view that *D. leiphaemia* and *D. dryophila* on *Quercus* are the same; also that *D. Radula* and *D. oligocarpa* are identical. But he does not agree that *D. Crataegi* and *D. semimmersa* are one species. *D. brachyceras* on *Ligustrum*, *D. crassicolis* on *Cornus*, *D. simulans* on *Rosa* agree with forms on Pomaceae and *Prunus* investigated by von Höhnelt. The author does not agree with von Höhnelt in separating the genus into *Euporthe*, *Tetrastaga*, and *Chlorostate*, and thinks that this treatment only serves to complicate the situation. Some general discussion of the genus is given and the importance of more culture work is emphasized. *Diaporthe Delogneana* Sacc. & Roum. and *D. helicii* Niessl. are considered identical and a detailed description is given. A new genus, *Phaeodiaporthe*, based on *P. Keissleri* n. sp. occurring on twigs of *Aesculus hippocastanum*, is described. It differs from *Diaporthe* in the dark colored spores.—H. S. Jackson.

2070. SKAIFE, S. H. Notes on some South African Entomophthoraceae. Trans. Roy. Soc. South Africa 9: 77-86. Pl. 2-4. 1921.—Records of South African Entomophthoraceae published up to the present are confined to writings on the locust fungus, *Empusa grylli*. In the present paper the occurrence of 6 species is recorded and notes have been made on their morphology. These species are: *Empusa muscae*, *E. conglomerata*, *E. grylli*, *Entomophthora aphidis*, *E. apiculata*, and *E. megasperma*.—E. M. Doidge.

2071. STORK, HARVEY E. Biology, morphology and cytoplasmic structure of *Aleurodiscus*. Amer. Jour. Bot. 7: 445-456. 3 pl. 1920.—*Aleurodiscus amorphus* grows on twigs and small branches of fallen balsam fir. A small species of *Tremella* is often parasitic on the fruiting bodies of this species, sometimes covering them entirely. The mycelium of *Aleurodiscus* grows throughout the intercellular spaces of the bark parenchyma, originating as a mass of densely woven hyphae in the deeper tissues, from which hyphae move upward, breaking through the bark and producing the typical fruit body. In the cytoplasm are large filaments and numerous granules, which are thought to be in a class with mitochondria, metachromatic bodies, and other structures that have been described in the cytoplasm of fungi.—E. W. Sinnott.

2072. SYDOW, H., UND P. [SYDOW] Aufzählung einiger in den Provinzen Kwangtung und Kwangsi (Süd-China) gesammelter Pilze. [Enumeration of some fungi collected in the provinces of Kwangtung and Kwangsi, South China.] Ann. Mycol. 17: 140-143. 1919 [1920].—Thirty two fungi of various groups, mostly parasitic species, collected by O. A. REINKING in May and June, 1919, are listed. The following new species are described: *Physopella sinensis* on *Cudrania* sp.; *Ustilago Apludae* in spikes of *Apluda mutica* var. *aristata*; *Eutypella Paliuri* on branches of *Paliurus ramosissimus*; *Phyllachora cantonensis* on *Litsea glutinosa*; *Helminthosporium Rhodomyrti* on *Rhodomyrtum tomentosa*. A new genus of uncertain position in the Fungi Imperfecti, Plenophysa, based on an hitherto undescribed species, *P. mirabilis*, occurring on leaves of *Ficus elastica* and *Zea mays*, is described.—H. S. Jackson

2073. SYDOW, H., UND P. [SYDOW] Über einige Uredineen mit quellbaren Membranen und erhöhter Keimporenzahl. [Concerning some Uredinales with gelatinous membrane and more than the usual number of germ pores.] Ann. Mycol. 17: 101-107. 1919 [1920].—Seven species of rusts of the Pucciniaceae having teliospores with a gelatinous outer wall and in some cases more than 1 germ pore. The authors decide that *Uredo cristata* Speg., from Paraguay on a Sapindaceous host, and *U. Toddaliae* Petch, from Ceylon on *Toddalia aculeata*, are not uredo but telio forms, the teliospore wall in each consisting of 2 layers, the inner colored and firm, the outer strongly echinulate and swelling considerably in water. For these species they establish a new genus, *Ctenoderma*. The necessity for a division of the genera *Puccinia* and *Uromyces* as now used is reviewed and the divisions proposed by ARTHUR and FISCHER are discussed. The authors give their ideas as to such divisions and propose 2 new genera, *Dichlamys* and *Trochodium*, for species of *Uromyces* with gelatinous teliospore walls. *Dichlamys* is founded on *Uromyces Trollipi* Kalchr. & McOwan, characterized by the apical germ pore and striations or ribs on the teliospores. *Trochodium* is founded on *Uromyces Ipomoeae* (Thuem.) Berk. from South Africa and is characterized by apically grooved teliospores with radial ribs and a swollen pedicel. The genus *Haplopyxis* is proposed for *Uropyxis*-like rusts having 1-celled teliospores; *Uropyxis Crotolariae* Arth. is the type. The possibility of *Uromyces dubiosus* P. Henn. on *Lantana* from Brazil representing a new genus is discussed. *Puccinia Adesmiae* P. Henn. on *Adesmia trijuga* from Argentine is transferred to the genus *Cleptomycus*.—E. B. Mains.

2074. THAXTER, ROLAND. Second note on certain peculiar fungus-parasites of living insects. Bot. Gaz. 69: 1-27. 5 pl. 1920.—New genera and species are described in several groups. *Cantharosphaeria* is a new genus of true ascomycetes, 1 species, *C. chilensis*, being described; this may be saprophytic, but the species noted below are certainly parasites. *Termitaria* is a new genus of the Fungi Imperfecti, perhaps referable to the Leptostromataceae, but quite isolated in its characters; *T. Snyderi* and *T. coronata* are described. In *Muilogone*

and *Muiaria*, previously described genera of the Dematiaceae, *Muiogone Medusae*, *Muiaria curvata* and *M. fasciculata* are described as new. *Aposporella* is a new genus of the Mucedineae, 1 species, *A. elegans*, being described. Of uncertain affinities are the new genera *Coreomycetopsis* (1 species, *C. oedipus*, being described), *Endosporella* (with 1 species, *E. Diopsidis*), and *Laboulbeniopsis* (with 1 species, *L. Termitarius*). New species of previously described genera, also of uncertain affinity, are *Thaxteriola nigromarginata*, *Amphoromorpha Blattina*, and *Enterobryus compressus*.—H. C. Cowles.

2075. THOM, CHARLES, AND MARGARET B. CHURCH. *Aspergillus flavus*, *A. oryzae*, and associated species. Amer. Jour. Bot. 8: 103-126. 1 fig. 1921.—Fermented food products from the Orient show a number of types of *Aspergillus*, some of the more characteristic and important of which were studied in cultures. These are *A. flavus*, *A. oryzae*, *A. parasiticus*, *A. effusus*, *A. Wentii*, *A. tanarii*, *A. terricola*, and *A. citrisporus*. Detailed cultural descriptions of these species are presented and their nomenclature, with that of related species, is discussed. A new variety, *A. terricola* var. *americana* Marchal is described.—E. W. Sinnott.

2076. WILL, H. Altes und Neues über die Riesenkolonien der Saccharomyceten, Mycoderma Arten und Torulaceen. [Some observations regarding giant colonies of *Saccharomyces*, *Mycoderma* spp. and *Torulaceae*.] Centralbl. Bakt. II Abt. 50: 1-23, 294-310, 317-335, 410-415. Pl. 3. 1920.—In this series of articles the author sums up the observations made by him on a large number of so-called giant colonies of the more commonly known species of *Saccharomyces*, *Pichia*, *Willia*, *Mycoderma*, and *Torulaceae*. He describes in great detail these giant colonies, which occur both on solid and liquid media; the factors which influence the development of the different growth forms; the zone formation which is very general in species of *Saccharomyces*; and finally classifies the giant colonies into fundamental types. The author thinks that these colonies represent one of the most important diagnostic characters for organisms of this type.—Anthony Berg.

2077. YASUDA, ATSUSHI. Eine neue Art von *Hypocrea*. Bot. Mag. Tôkyô 34: 1, 2. 2 photo. 1920.—*Hypocrea japonica* Yasuda is described and illustrated.—L. L. Burlingame.

LICHENS

2078. BACHMANN, E. Die Beziehung der Knochenflechten zu ihre Unterlage. [The relation of the bone lichens to the substratum.] Centralbl. Bakt. II Abt. 50: 368-379. Fig. 9. 1920.—The term bone lichen should not be given the same value as the commonly adopted term lime lichen as this latter form, at least the endolithic type, can use only calcium carbonate as a substratum while the bone lichen is found only occasionally upon bone, more commonly on wood, stone, or earth. The object of the present investigation was to determine the relation of these lichens to their newly adopted substratum. Three species were examined, *Bacidia albicans* (Hepp) Zwachk; *Lecidea goniophilia* Flk.; and *Caloplaca pyracea* (Ach.). Of these only the last is a lime lichen. Examination of *Bacidia albicans* on bones from 3 localities showed that the lichen was attached externally only as in the exolithic lichens *Catillaria micrococca* and *Bacidia Arnoldia* upon lime and *Scolicosporum compactum* and *S. umbrinum* on silicate rock. However, due to the great porosity of some bone substances the lichen forces its way into and partly fills the pores and galleries. Its growth upon bone free from pores is exolithic; upon highly porous bone, partly exotitic and partly hypostitic. *Lecidea goniophilia* exists also exotitically and hypostitically on bone, never as an epilithic or even as an endolithic lichen upon lime. *Caloplaca pyracea* (Ach.), which grows epilithically on lime stone, does not dissolve the bone substances, but seems to possess a greater mechanical power of forcing itself deeper into the pores of the substratum than does *Lecidea goniophilia*. The thalli of these lichens when grown on bone develop more vigorously and contain more gonidia than when growing on lime or some barks. Bone is therefore a very favorable substratum for the development of lichens, not because it furnishes certain nutrients but because of its great capacity of absorbing and retaining water.—Anthony Berg.

2079. LETTAU, G. Schweizer Flechten. I. [Swiss lichens I.] Hedwigia 60: 84-128. 1918.—Lists of lichens collected at various points in Switzerland, with descriptive notes. [See also following entry.]—*H. M. Fitzpatrick.*

2080. LETTAU, G. Schweizer Flechten. II. [Swiss lichens II.] Hedwigia 60: 267-312. 1919.—A continuation of a previous paper by the author (see preceding entry), and giving lists of lichens with descriptive notes, based on collections made at additional points in Switzerland.—*H. M. Fitzpatrick.*

2081. ZAHLBRÜCKNER, A. Flechtensystematische Studien. I. Die Flechtengattung *Rhabdospora* Müll. Arg. [Systematic studies on lichens. I. The lichen genus *Rhabdospora*.] Hedwigia 59: 301-304, 305, 306. 2 fig. 1917, 1918.—A critical study of the morphology of the thallus and fruit-body. The genus is said to differ from *Bactrospora* in that the algal component belongs to the Cyanophyceae, and in that the fruit-body is pyrenocarp.—*H. M. Fitzpatrick.*

2082. ZSCHACKE, HERMANN. Die mitteleuropäischen Verrucariaceen. [The Verrucariaceae of middle Europe.] Hedwigia 60: 1-9. 1918.—Brief notes on species of *Staurothele* and *Polyblastia*.—*H. M. Fitzpatrick.*

BACTERIA

2083. BARNES, W. H. The activity of staphylococci in milk. Jour. Infect. Diseases 28: 259-264. 1921.—The growth of staphylococci in milk is suggested as a factor in their classification, due to the variety of reactions obtained.—*Selman A. Waksman.*

2084. HANER, R. C., AND W. D. FROST. The characteristics of the microcolonies of some pathogenic cocci. Jour. Infect. Diseases 28: 270-274. 2 pl. 1921.—A new method of drying down and staining colonies of bacteria only a few hours old is described and a study is made of microcolonies of some staphylococci, streptococci, and pneumococci.—*Selman A. Waksman.*

2085. RAHN, OTTO. Versuche einer natürlichen Gruppierung der Bakterien. [An attempt at presenting a natural classification of the bacteria.] Centralbl. Bakt. II Abt. 50: 273-293. Fig. 2. 1920.—A theoretical discussion of the origin and inter-relationships of the various groups of the bacteria. No detailed system of classification is outlined, the results of the inquiry being chiefly negative.—*H. M. Fitzpatrick.*

PALEOBOTANY AND EVOLUTIONARY HISTORY

E. W. BERRY, Editor

(See also in this issue Entries 2007, 2008)

2086. ARBER, E. A. NEWELL. Devonian floras, a study of the origin of Cormophyta. 100 p., 47 fig. Cambridge Univ. Press: 1921.—An incomplete summary of Devonian plants results in considering them to represent 2 radically different types,—an earlier, termed the Psilophyton flora or Procormophyta, and a later, termed the Archaeopteris flora. The former, possibly comprising the genera *Psilophyton* (which Arber considers identical with the petrified material known as *Rhynia*), *Psilophyton*, *Thursophyton*, *Barrandeina*, *Barinophyton*, and *Taeniocrada*, are considered as Thallophyta which anatomically were intermediate between algae and vascular plants. The latter, comprising the genera *Sphenophyllum*, *Pseudobornia*, *Archaeopteris*, *Rhacopteris*, *Bothrodendron*, etc., are considered true pteridophytic plants closely related to their descendants of the Lower Carboniferous.—The *Sphenophyllum*-*Calamite*-*Equisetum* line, the fern line, and the *Lepidodendron*-*Sigillaria*-*Lycopod* line are considered unrelated and independent derivatives of algal ancestors. The existing Psilotales are considered to represent a relatively modern group resulting from the transmigration of algae and not related to the Psilophytales, and the Bryophyta are considered to have had a like indepen-

dent origin late in geologic time. The complex wood of seed plants of the Cordaitan plexus in Devonian time is ignored. The stages in the evolution of steles are considered to be from a monarch type consisting of a single protoxylem group and formed by the simultaneous modification of a set of procambial elements, occurring independently in the axis and branches. Second, by the substitution of continuous for purely initial transformation; and third, by the formation of secondary cambium and secondary wood.—*E. W. Berry.*

2087. BENSON, W. N., W. S. DUN, AND W. R. BROWNE. Part IX. The geology, palaeontology and petrography of the Currabubula district, with notes on adjacent regions. B. Palaeontology, including CHAPMAN, F. Appendix. Lower Carboniferous limestone fossils. Proc. Linn. Soc. New South Wales 45: 337-374. Pl. 18-24, fig. 10-17. 1920.—Mention is made of leaf impressions of *Rhacopteris*, *Aneimites*, and *Archaeocalamites*, and descriptions are given of 2 sets of silicified plant remains. LAWSON is credited with the descriptions. Chapman also reports the presence of the thread-like thallus of a species of *Girvanella* (Cyanophyceae) in oolitic limestone from the Lower Carboniferous. Besides the fine tube of the thallus he observed here and there indications of strings of minute globular cells (probably reproductive).—*Eloise Gerry.*

2088. CARPENTIER, A. Notes Paléophytologiques sur le Westphalien du Nord de la France. [Paleophytological notes on the Westphalien of the north of France.] Ann. Soc. Géol. Nord. 44: 137-150. Fig. 3, pl. 2. 1920.—Five sigillarias including 2 new varieties, 1 lepidodendron, 4 ferns including a new *Taeniopteris* (?), and a seed called *Neuropterocarpus* which is associated with the fronds of *Neuropteris rarinervis*, are described from the Westphalian stage (Carboniferous) of the Departments of Nord and Pas-de-Calais in France.—*E. W. Berry.*

2089. FRITEL, P. H. Sur la présence des genres *Phragmites* Trin. et *Nephrodium* L. C. Rich. dans les argiles pleistocenes de Benenitra (Madagascar). [On the presence of *Phragmites* and *Nephrodium* in the Pleistocene clays of Benenitra in Madagascar.] Compt. Rend. Acad. Sci. Paris 171: 1389-1390. 1920.

2090. MACBRIDE, E. W. Recapitulation and descent. Nature 106: 280-281. 1920.

2091. NUTTING, C. C. Is Darwin shorn? Sci. Monthly 12: 127-136. 1921.—This is a criticism of "A critical glance at Darwin" by John Burroughs in the August (1920) number of the Atlantic Monthly.—DEVRIES, JENNINGS, CASTLE, WILSON and DAVID STARR JORDAN are quoted to show that Darwin's theory of natural selection is not repudiated by scientists.—*L. Pace.*

2092. SCOTT, D. H. Studies in fossil botany. Vol. 1. Pteridophyta. 3rd ed., xxiii + 434 p., 190 illus. A. & C. Black Ltd.: London, 1920.—The 3rd edition of this well known text contains little that was not in the 2nd edition except for a summary of the results of the work of KIDSTON & LANG on the petrified Devonian plants from the Rhynie schist of Scotland. These are recognized as constituting the basis for a new order—the Psilophytales, as proposed by the authors mentioned.—*E. W. Berry.*

2093. WALKOM, A. B. Mesozoic Floras of New South Wales. Pt. 1. Fossil plants from Cockabutta Mountain and Talbragar. Mem. Geol. Surv. New South Wales Palaeontol. 12: 1-21. 7 pl. 1921.—A number of Mesozoic types, largely cosmopolitan forms, are recorded. The genera represented are *Cladophlebis*, *Coniopteris*, *Thinnfeldia*, *Taeniopteris*, *Podozamites*, *Araucarites*, *Brachyphyllum* (?), *Elatocladus*, and *Pagiophyllum* (?). *Araucarites grandis*, based on a large cone-scale, and *Thinnfeldia talbragarensis* and *T. pinnata*, are described as new. Attention is called to the absence of all traces of *Ginkgo* and *Baiera*. The flora is considered to be of Jurassic, and probably lower Jurassic, age.—*E. W. Berry.*

PATHOLOGY

G. H. COONS, *Editor*C. W. BENNETT, *Assistant Editor*

(See also in this issue Entries 1606, 1614, 1618, 1842, 1930, 1937, 1959, 1968, 1974, 1997, 1998, 2061, 2063, 2065, 2067, 2069, 2071, 2072, 2188, 2195, 2202, 2227)

PLANT DISEASE SURVEY; REPORTS OF DISEASE OCCURRENCE AND SEVERITY

2094. ANONYMOUS. The mosaic disease of the sugar cane in Trinidad. [Rev. of: WILLIAMS, C. B. The mosaic disease of the sugar cane in Trinidad. Bull. Dept. Agric. Trinidad and Tobago 19, part 1. 1920.] Internat. Sugar Jour. 23: 74-75. 1921.

2095. KIRBY, R. S., AND H. E. THOMAS. The take-all disease of wheat in New York State. Science 52: 368. 1920.—Early in July 1920 attention was attracted to a small spot in a field of soft, red, winter wheat at East Rochester, New York. The plants were badly dwarfed and prematurely dead. In many cases secondary culms had been killed. Laboratory examination showed that the roots of the plants were rotted, and that the lower internodes were dark or entirely blackened and enveloped by a dense sheath-like plate of brown mycelium. Perithecia were found embedded in the leaf sheath and mycelial plate. Microscopic measurements of perithecia and ascospores agree very closely with those given by Saccardo for *Ophiobolus graminis*. Steps were taken to determine the source of infection and to completely eradicate the disease. No other evidence of take-all disease was found on this farm or on those in the vicinity. The crop from an area 40 feet in diameter was spread over the ground, gasoline was poured over the infected spot and vicinity, and the whole was then burned over.—A. H. Chivers.

2096. LEE, H. ATHERTON, AND MARINO G. MEDALLA. La enfermedad banda amarillo en Filipinas. The yellow stripe disease in the Philippines.] Sugar 23: 53-54. 1921.—Mosaic or yellow stripe disease of sugar cane as it occurs in various sugar countries is described with a brief mention of different control measures.—C. W. Edgerton.

2097. McCUBBIN, W. A. The potato wart situation. Potato Mag. 3^s: 5, 26-28. 2 fig. 1921.—The wart disease of potato (*Solanum tuberosum*) has been found in U. S. A. in 3 states, 58 towns and villages, and about 800 gardens covering less than 100 acres. Quarantine measures are in force, but need to be re-enforced by more complete surveys and by more feasible eradication methods than now exist. Immune varieties are being studied.—Donald Folsom.

2098. MONTEMARTINI, L. Alcune malattie nuove o rare osservate nel Laboratorio di Patologia Vegetale di Milano 22-26. [Some new or rare diseases observed in the Laboratory of Vegetable Pathology of Milan Nos. 22-26.] Rev. Patol. Veg. 10: 119-125. 1920.—A *Macrosporium* was found on the leaves of *Robinia pseudacacia* that were drying up, beginning at the margins and running in between the principal veins. Observations were made on the attack of the fungus *Clasterosporium amygdalearum* on an apricot tree that had remained immune though surrounded by severely affected cherries. However, it also was attacked when severely pruned. The pomegranate is described as a new host of *Hadrotrichum populi*. *Phyllosticta macrocarpae* is described as a new species causing a leaf spot that runs in between the lobes of the leaves of *Quercus macrocarpa*. A new form of a rust is described, based on the longer peridia of the aecia, namely, *Gymnosporangium clavariaeforme* (Jacq.) Rees f. *longissima* Montem., on *Crataegus oxyacantha*.—F. M. Blodgett.

2099. SIMMONDS, H. W., AND C. H. KNOWLES. A disease of *Clidemia hirta* in the lower Rewa District. Dept. Agric. Fiji Circ. 1. 9-12. 1920.—A disease was found to be destroying the plants of *Clidemia hirta*, which is a bad weed in this region. The external appearance of the diseased and dead plants is described. Efforts were made to determine the causal organ-

ism, but these have not yet been successful. It is thought that a species of *Heterodera* is primarily responsible.—C. V. Piper.

THE PATHOGENE (BIOLOGY, INFECTION PHENOMENA, DISPERSAL)

2100. HARVEY, R. B. Destruction of zoospores of plant disease organisms by natural enemies. Science 52: 84. 1920.—In making motion-picture photomicrographs of the liberation of zoospores from the sporangia of *Physoderma zeae-maydis*, the author observed destruction of the zoospores by certain animalcules which are commonly found in decaying vegetable material. The number of zoospores swallowed by one rotifer (*Proales* sp.) is very large. In starting with dry material collected from corn stalks infested with *Physoderma*, the animalcules appear first, and are on hand for each crop of zoospores.—A. H. Chivers.

2101. RAVAZ, L. Rapport sur le fonctionnement de la station d'avertissements agricoles de Montpellier, en 1918. [Report of the Agricultural Experiment Station of Montpellier, 1918.] Ann. École Nation. Agric. Montpellier 17: 131-167. Fig. 1-27. 1918 [1919].—The main part of the report is devoted to work with grape mildew (*Plasmopara viticola*). Temperature and humidity are considered the most important factors concerned in the development of this disease, and for this reason meteorological data are reported from various points in the grape-growing section. A minor part of the report consists of observations made on black rot [*Guignardia bidwellii*] and insects. A historical review of the station is also given.—F. P. Halma.

2102. SHUNK, I. V., AND F. A. WOLF. Further studies on bacterial blight of soybean. Phytopath. 11: 18-24. Fig. 1. 1921.—A comparison of the pathological symptoms of the bacterial blight of soybean (*Soja max*) described by COERPER in Wisconsin and that described by Wolf in North Carolina has shown only minor differences in the appearance of the diseased spots; but differences in the reactions and growth characteristics on various culture media were sufficient to prove the causal organisms distinct. The two diseases, one produced by *Bacterium glycinum* Coerper and the other by *B. sojæ* Wolf, are found in Wisconsin, but only the one produced by the latter organism has been found in North Carolina.—B. B. Higgins.

2103. THOMAS, H. E. The relation of the host and other factors to infection of *Apium graveolens* by *Septoria apii*. Bull. Torrey Bot. Club 48: 1-29. 1921.—The idea of specificity in the relation of plant parasites to their hosts is coming to be one that must be reckoned with; the obligate parasite is restricted in its host range and a slight change in either host or fungus may completely change the virulence of the parasite or its effect on the host. Data are presented in this paper to show that the infection of *Apium graveolens* by *Septoria apii* is favored by conditions which accelerate the growth of the host. Work with many hosts showed a high degree of specialization on the part of the parasite in its inability to cause infection. Experiments were conducted on host plants treated with various solutions to produce different degrees of health and vigor. Plants suffering from nematodes, and etiolated plants, were also used. The parasite's development was favored by increased growth in the host and showed a high degree of specialization. This specialization suggests promise for experiments in breeding for resistance.—P. A. Munz.

THE HOST (RESISTANCE; SUSCEPTIBILITY; MORBID ANATOMY AND PHYSIOLOGY)

2104. SCHLUMBERGER, O. Pflanzenschutz und Sortenfrage im Kartoffelbau. [The question of varieties and disease resistance in potato culture.] Fühling's Landw. Zeitg. 69: 144-149. 1920.—A general discussion of the problem of obtaining disease-resistant varieties of potatoes is presented. Pathological investigations of potato diseases and physiological studies of diseased and disease-resistant varieties or individual plants to determine the underlying causes of resistance or susceptibility to disease should be carried on in a systematic way to

arrive at fundamental principles upon which selection of disease-resistant sorts may be based. All new introductions should be tested in localities where particular diseases are prevalent.—*A. T. Wiancko.*

DESCRIPTIVE PLANT PATHOLOGY

2105. ANONYMOUS. The menace of the white pine blister rust. *Amer. Forestry* 27: 6. 1921.

2106. BIJL, P. A. VAN DER. Notes on some sugar cane matters. *Jour. Dept. Agric. Union of South Africa* 2: 122-128. *Fig. 1-5.* 1921.—Notes are given on the root disease caused by *Himantia stellifera*, leaf diseases (due to *Leptosphaeria sacchari* and *Helminthosporium sacchari*), and the stalk diseases caused by *Melanconium sacchari* and *Cephalosporium sacchari*. Reference is also made to the non-setting of seed in Uba and other cane varieties in South Africa.—*E. M. Doidge.*

2107. BOTTOMLEY, A. M., AND K. A. CARLSON. Parasitic attack on *Eucalyptus globulus*. A note on *Stereum hirsutum* in plantations in the Transvaal. *Jour. Dept. Agric. Union of South Africa* 1: 852-858. *Pl. 1-2.* 1920.—A parasitic attack of *Stereum hirsutum* on *Eucalyptus globulus* in gum plantations on the farm Cliffendale near Roodepoort is described. The disease is confined to stem tissues where it produces a characteristic soft dry rot which renders the timber useless for industrial purposes. An examination of the above and other plantations showed that the fungus was common as a saprophyte on old stumps and that Cliffendale was the only locality where it had become parasitic; and further that *E. globulus* was the only species of gum susceptible to the disease. The attack in this case was thought to be due probably to lack of vigor in the trees occasioned by unsuitable local conditions of soil or climate or both. Control measures advocated consist in growing only those species found to be most suitable to the area in question and in the destruction of all infected stumps by means of the saltpeter and kerosene oil method.—*A. M. Bottomley.*

2108. BROOKS, F. T., AND M. A. BAILEY. Silver leaf disease (including observations upon the injection of trees with antiseptics). *Jour. Pomology* 1: 81-103. 1920.—Reprinted with abridgments from *Jour. Agric. Sci.* 9: 189-215. 1919.—*L. H. MacDaniels.*

2109. CHEEL, EDWIN, AND J. B. CLELAND. Disease in forest trees caused by the larger fungi. *Forest. Commission New South Wales Bull.* 12. 12 p., *pl. 1-20.* 1918.—The author emphasizes the importance of the study of fungi causing decay of living trees, stored lumber, and building timbers, giving non-technical descriptions of various members of the genera *Armillaria*, *Pholiota*, *Polyporus*, *Polystictus*, *Fomes*, *Hexagona*, and *Trametes* which have been found or may be found causing decay of important woods. The plates illustrate the rots produced by, or the sporophores of, the following forms: *Armillaria mellea*, *Pholiota adiposa*, *Polyporus eucalyptorum*, *P. ochroleucus*, *P. gilvus*, *P. dryadeus*, *P. salignus*, *Polystictus versicolor*, *Fomes robustus*, *F. applanatus* var. *australis*, and *Trametes lactinea*.—*Reginald H. Colley.*

2110. DOIDGE, E. M. A tomato canker. *Jour. Dept. Agric. Union of South Africa* 1: 718-721. 1 *fig.* 1920.—A popular account of a bacterial disease of tomatoes caused by *Bacterium vesicatorium*.—*E. M. Doidge.*

2111. DUFRENOY, JEAN. Witches'-brooms of *Pinus maritima*. *Phytopathology* 11: 27. 1921.—Examination of hypertrophied tissues from witches'-brooms occurring on *Pinus maritima* in southwestern France showed the cambial cells generally infested by bacteria, which, when inoculated into young buds of *P. maritima*, killed the buds but failed to produce witches'-brooms.—*B. B. Higgins.*

2112. FRYER, P. J. Insect pest and fungus diseases of fruit and hops. *xv + 728 p.*, 24 colored *pl.*, 305 *fig.* Cambridge University Press: London, 1920.—The author has prepared

a "complete manual for growers," with the following plan of presentation. The book is divided into 11 "sections," distributed in 3 "parts":—Sect. I, Introduction; Sect. II, How fruit trees live. PART I, Insect pests and their control: Sect. III, About insects; Sect. IV, Insect pests; Sect. V, Insecticides; Sect. VI, Beneficial insects. PART II, Fungus diseases of fruit and their control: Sect. VII, Fungus diseases; Sect. VIII, Fungicides. PART III, Spraying in theory and practice: Sect. IX, Spraying appliances and methods; Sect. X, Spraying calendar; Sect. XI, Tables and appendices. Pests are considered by groups, and for each pest the data are presented in simple language in accordance with a standard outline. The first 476 pages of the book are used in the discussion of insect pests and their control. Fungus diseases of the apple, cherry, currant, gooseberry, hop, peach, pear, plum, raspberry, strawberry, and grape are considered in the following 151 pages. In the case of each fungus disease the data are presented wherever possible in a standard manner similar in plan to the scheme used in the section on insect pests. The description of spraying methods and outfits is comprehensive. The last 2 sections in the book are arranged so that the grower may easily find information on the spraying calendar or the tables of equivalents.—*Reginald H. Colley.*

2113. GRIESBECK, A. Die Erreger der Schwartzbeinigkeit bei Kartoffeln. [The causes of blackleg in potatoes.] *Fühling's Landw. Zeitg.* 69: 37-38. 1920.—While APPEL found *Bacillus phytophthorus* to be a cause of blackleg in potatoes he indicated that other organisms might contribute to the disease. The present author found that hollow places in the earth beside the potato stems caused by burrowing animals such as mice and moles were associated with the appearance of the disease. It is supposed that injury to the stem or merely the existence of the hollow space beside the stem causes dying of the tissues and gives access to moulds and rotting bacteria. It is suggested that hoeing to break up the animal burrows would cause partially affected stems to recover and that ridding the land of these burrowing animals would effectively control the disease.—*A. T. Wiancko.*

2114. MABEE, W. B., AND R. A. JEHL. Insect pests and diseases of apples in North Carolina and their control. *Bull. North Carolina Dept. Agric.* 1921³: 1-24. 1921.—A popular illustrated account of apple scab, blotch, blackrot, bitter rot, sooty blotch, rust, stippen, and fire blight of apples, with remedial and control measures.—*F. A. Wolf.*

2115. NORTON, J. B. S., AND C. C. CHEN. Another corn seed parasite. *Science* 52: 250. 1920.—A fungus which seems to have been given little consideration as a parasite has recently been isolated by the authors from sweet corn seed. The fungus was frequently found in corn from a field that had many dwarf, distorted, and barren stalks, and some root rot. The fungus has been isolated and its pathogenicity tested. The tests show the same effects as in the field. The fungus corresponds very well with descriptions and figures of *Oospora verticilloides*. It is probable that the fungus has been recorded under other names.—*A. H. Chivers.*

2116. NOWELL, W., AND C. B. WILLIAMS. Sugar cane blight in Trinidad. [Reprint of *Bull. Dept. Agric. Trinidad and Tobago* 19, part 1. 1920.] *Internat. Sugar Jour.* 23: 154-155. 1921.—The fungi causing root disease of sugar cane, at present known in Trinidad, belong to the genera *Marasmius* and *Odontia*. They occur to some extent in all cane fields and become serious when the vigor of the cane is decreased by adverse factors. The prevalence of root disease over wide areas in Trinidad, reported last year, is due to the weakening of the cane by attacks of froghopper. The effect of root disease with or following froghopper injury prevents recovery of the cane. Control measures suggested are the reduction of the ratooning period, improved cultivation, manuring, and rotation of crops.—*C. Rumbold.*

2117. POETEREN, N. VAN. De Aardappelwratziekte. [Potato wart.] *Tijdschr. Plantenz.* 27: 1-13. *Fig. 1-7.* 1921.—A general discussion of potato wart (*Chrysophlyctis endobiotica*), including symptoms, cause, mode of dissemination, importance, distribution in general and in Holland, eradication, and legislative measures in Holland for the eradication of the disease. Distribution of this disease in Holland is limited to 5 townships which are located on the Ger-

man border. Experiments with resistant varieties are under way; so far, only the variety Ceres has proved resistant. The legislative measures are strict and far reaching, and complete eradication of the disease in Holland is being attempted.—*D. Atanasoff*.

2118. QUANJER, H. M. Considerations nouvelles sur les maladies de la pomme de terre. [Recent work on the diseases of potato.] Bull. Soc. Path. Veg. France 7: 102-118. 1920.—An address given under the auspices of the Phytopathological Society of France in Paris. A résumé of the recent work on the principal diseases of the potato is given with special attention to the mosaic disease and the results of the author's investigations which have already been published elsewhere.—*C. L. Shear*.

2119. SALISBURY, E. J. [Rev. of: BUTLER, E. J. Fungi and disease in plants. vi + 547 p., 5 pl., 205 fig. Thacker, Spink & Co.: Calcutta and Simla, 1918.] Sci. Prog. [London] 13: 677-678. 1919.

ERADICATION AND CONTROL

2120. ANONYMOUS. Broeiproeven van tegen aaltjesziek behandelde Narcissenbollen. [Heating experiments with nematodes in narcissus bulbs.] Weekbl. Bloembollencult. 30: 303, 312. 1920.—A number of narcissus bulbs were kept for 1, 2, and 3 hours in water at 110-111°F. to destroy nematodes. Treatment for 1 or 2 hours gave best results. Experiments were carried on with the following varieties: King Alfred, Emperor, Golden Spur, and N. Leeds Lucifer.—*J. C. Th. Uphof*.

2121. ANONYMOUS. Control of the white pine blister rust. Bien. Rept. New Hampshire State Forest. Commission 1919-1920: 39-52. 1920.—A systematic survey, begun with the discovery of the disease in 1916 and continued through 1920, has proved that the white pine blister rust is generally distributed in the pine regions of the state. As examples of the degree of infection the following cases may be cited: On a narrow strip 70 miles long in the Ammonoosuc Valley, 24 per cent of the pines were diseased; in the same region, on a plot of 43 acres, 55 per cent of the pines were diseased; both cultivated and wild *Ribes* were found to be generally infected in all areas scouted. There is only one known and proved method of checking the rust, and that is the removal of all *Ribes*. The amount of eradication work and the cost for 1917 compared with that of 1920, and the total work done, are shown in the table.

YEAR	TOWNS WORKED	ACRES COVERED	AVERAGE COST PER ACRE	WILD BUSHES DESTROYED	CULTIVATED BUSHES DESTROYED
1917.....	4	23,043	\$0.42	462,500	500
1920.....	49	203,641	0.175	2,057,936	21,298
1917 to 1920 total.....		457,389	0.227	5,139,704	51,396

A table giving the 1919 and 1920 costs for the individual towns is appended. The actual cost to the state for eradication of approximately half a million acres was about \$.05 per acre, the rest of the funds being furnished through cooperative agreement by the Federal government and the towns. Improved methods of advance surveys by men who mark areas requiring the attention of crews have reduced the cost and made possible the covering of a much larger acreage. The crews averaged better than 96 per cent eradicating efficiency. At the present rate 7 or 8 years more will be required to eradicate *Ribes* spp., from the whole state; and in view of the heavy potential loss to pine owners the work should be continued with all the funds which can be made available.—*Reginald H. Colley*.

2122. BRITTON, W. E., AND G. P. CLINTON. Spray calendar. Connecticut [New Haven] Agric. Exp. Sta. Bull. 224. 67-110. 1921.—This is the 5th revision of the spray calendar issued by the station. It includes brief descriptions, with preventive measures, of insects and fungi attacking 98 species of plants growing in the state. Methods are given for the prep-

aration of 16 insecticides and fungicides, 7 commonly used fungicides, and 6 less commonly used ones. Lists of manufacturers and dealers in spray machines and spray materials are included.—*Henry Dorsey.*

2123. CHEYNEY, E. G. Preliminary investigation of *Ribes* as a controlling factor in the spread of white pine blister rust. *Science* 52:342-345. 1920.—The control of white pine blister rust, or rather the protection of white pine, depends on a definite knowledge of the habits of species of *Ribes*, especially of the wild plants. Projects were therefore planned to cover the following points: (1) To study the sprouting of different species of *Ribes* eradicated in different months and under different moisture conditions; (2) to study the cost and effectiveness of eradication in different months; (3) to determine the number of years eradication will have to be practiced; (4) to study the reproduction of different species of *Ribes* by seed and layering; (5) to determine the effect of pruning and cutting off the roots at different depths and at different dates; (6) to determine growth habits of different species. From experiments on the areas selected, namely, the Rush Lake region, Minnesota, the following results, though not conclusive, are significant: There was a higher percentage of sprouts from plants eradicated on the moist type of soil than on the dry or swamp types; a larger percentage of sprouts from plants which were grubbed than from plants which were pulled; tendency to sprout from the root ends seemed much stronger in plants pulled in May and June than late in summer; plants cut off above the crown almost invariably sprouted in all types and at all seasons, with the exception of the swamp species, *R. triste*. The number of large plants missed by eradication crews was very small (less than 5 per cent). The number of seedlings left was very much larger, but the leaf surface of these is very small. None of these seedlings was found to be infected, and is it questionable whether they live over to the second season in large numbers. It has been the practice in the state to pull the plants whenever possible rather than to grub them. Evidence indicates that the reverse practice would be preferable since it seems to be a fact that practically all sprouts come from pieces of crowns and from root ends which are exposed to light.—*A. H. Chivers.*

2124. DETWILER, S. B. Safeguarding the white pine crop. *Amer. Forestry* 27: 7-11. 8 fig. 1921.—A résumé of the conclusions reached by the Sixth Annual International Blister Rust Conference held in Boston, Massachusetts, under the auspices of the American Plant Pest Committee. It was the opinion of the conference that a zone 200-300 yards in width cleared of currant and gooseberry bushes, will insure the commercial growing of white pines under average conditions. In 1920 the cost of control in all states averaged 35 cents per acre as compared with 54 cents in 1919 and 66 cents in 1918. These figures include labor, supervision, and transportation of field men.—*Chas. H. Otis.*

2125. FIELDS, W. S., AND JOHN A. ELLIOTT. Making Bordeaux mixture, and some other spraying problems. *Arkansas Agric. Exp. Sta. Bull.* 172. 12 p., 1 pl. 1920.—The effect of different methods of mixing on the settling and deterioration of Bordeaux mixture is shown in tables and figures. Recommendation is made to dilute the CuSO_4 solution in the spray tank and to add the milk of lime while agitating the dilute copper solution. No appreciable differences in times of settling of lead arsenate in Bordeaux mixture and in lime-sulphur solution were found with waters of different degrees of hardness.—*John A. Elliott.*

2126. MELHUS, I. E., AND J. C. GILMAN. Measuring certain variable factors in potato seed treatment experiments. *Phytopath.* 11: 6-17. Fig. 1-5. 1921.—The 3 principal variable factors affecting the value of potato (*Solanum tuberosum*) seed treatment are: The presence of living pathogenes on the tubers after treatment; the continued antiseptic action of the solution used in the treatment; and the percentage of infection resulting from pathogenes already in the soil.—To study the 1st of these variables, scabby tubers were treated with solutions of formaldehyde and of HgCl_2 , varying the temperature, the strength of the solution, and the time of exposure. Tissue from scab sori of the treated and the untreated tubers was then plated and the numbers of resulting colonies of the scab organism (*Actinomyces scabies*) compared. Tubers dipped for $2\frac{1}{2}$ minutes in formaldehyde solution 1-120 at a temperature

of 50°C., and covered for 1 hour, were the only ones completely sterilized. It was found, however, that enough HgCl_2 solution remained on the surface of the tubers to exert a decided antiseptic action.—Similar tests were also made with both *Rhizoctonia solani* and *Spondylocladium atrovirens*.—By running a large number of checks with treated and untreated seed, it was found possible to measure the percentage of infection resulting from the presence of *Rhizoctonia* and *Actinomyces* in the soil.—B. B. Higgins.

2127. MÜLLER-THURGAU, H., UND A. OSTERWALDER. Versuche zur Bekämpfung der Kohlhernie [Experiments on the control of club root of cabbage.] Landw. Jahrb. Schweiz 1919: 1-22. Fig. 1-7. 1919.—Experiments on the control of club root (*Plasmodiophora brassicae*) in kohlrabi and cabbage are described. Different forms of lime, sulphur and formalin were applied to the soil in various amounts. Burned lime and hydrated lime are said to have given satisfactory results.—J. D. Luckett.

2128. SANDERS, G. E., AND A. KELSALL. Dusts and dusting for insect and fungus control. Sci. Agric. [Canada] 1: 14-18. 1921.—This article gives results of dusting experiments in Nova Scotian orchards.—B. T. Dickson.

MISCELLANEOUS (COGNATE RESEARCHES, TECHNIQUE, ETC.)

2129. CHURCH, MARGARET B. The relation of mosaic disease to pickling of cucumbers. Phytopath. 11: 28-29. 1921.—Cucumbers visibly affected with mosaic disease do not make good dill pickles. They do not clear up properly in the brine.—B. B. Higgins.

2130. REDDICK, D. Foot rot of tomato. Phytopathology 11: 29. 1921.—The name "Foot rot" for the tomato disease caused by *Macrosporium solani* is claimed to be preempted because of previous use in connection with the disease caused by *Phytophthora cryptogea*. Use of generic names of causal organisms as descriptive adjectives is proposed.—G. H. Coons.

2131. [THOMPSON, M. R. H.] Cold storage conditions for export. Jour. Dept. Agric. Union of South Africa 2: 133-136. Fig. 1-2. 1921.—A report on the presence of organisms causing decay in fruit in cold storage rooms in Cape Town. It is stated that the condition of the rooms was satisfactory.—E. M. Doidge.

2132. WAGNER, ESTHER A., AND W. F. MONFORT. Lactose broth for isolating *Bacterium coli* from water. Amer. Jour. Public Health 11: 203-208. 1921.—The authors advise a broth containing 2 per cent peptone, 0.2 per cent lactose, and 0.001 per cent gentian violet, to be used with an equal volume of water. It is claimed that the use of the gentian violet makes possible sterilization of the medium by pasteurization in place of autoclaving, thus obviating the hydrolysis of the sugar which occurs at autoclave temperatures.—C. A. Ludwig.

PHARMACOGNOSY AND PHARMACEUTICAL BOTANY

HEBER W. YOUNGKEN, *Editor*

E. N. GATHERCOAL, *Assistant Editor*

(See also in this issue Entries 1589, 2001)

2133. ANONYMOUS. The Mulford Biological Exploration of the Amazon Basin. Amer. Jour. Pharm. 92: 815-820. 1920.—A complete prospectus of the proposed Mulford Biological Exploration of the Amazon Basin, under the direction of Doctor Rusby.—Anton Hogstad, Jr.

2134. KREMERS, EDWARD. Quarter of a century of chemical investigation of a typically American genus of plants. Jour. Amer. Pharm. Assoc. 9: 1175-1176. 1920.—A portion of an address in which the author presents an explanation justifying the continuation of exhaustive research on a single genus, *Monarda*, which he has been actively engaged upon during the

past 25 years.—The author states that the horizon has grown wider and the subject more intensely interesting than ever before. He points to the recent discovery of a new terpene, possibly more correctly of 2 new terpenes; to the synthesis of new dyestuffs; and to the study of intramolecular changes of isomeric derivatives. The economic possibilities are not discussed.—*Anton Hogstad, Jr.*

2135. LLOYD, J. T. Spiders used in medicine. *Amer. Jour. Pharm.* 93: 18-24. *Fig. 2.* 1921.—An account of the use of spiders and spider webs in medicine, including a number of excerpts from historical literature on medicine. Owing to the popular lack of knowledge regarding the distinctive characteristics of spiders and insects, these characteristics are portrayed in a series of sketches. The author states he has handled large numbers of native spiders as well as hundreds of "banana tarantulas," which are not true tarantulas, and has found them all harmless. Although no chemical analyses of the spider web are known, tests have shown the absence of sugar; a slight reaction towards alkaloids has been observed. Spiders of the sub-family Aviculariinae, commonly known as "tarantulas" or bird spiders, are used by homoeopathic physicians. Until recently the web was administered in the form of a pill, but at the present time it is administered in the form of an alcoholic preparation known as "Tela Araneae."—*Anton Hogstad, Jr.*

2136. MITCHELL, D. T. Poisoning of cattle by *Diplodia*-infected maize. *South African Jour. Sci.* 16: 446-452. 1920.—A disease in cattle characterized by incoordination of movement and paralysis is produced by feeding mealy cobs which are infected with *Diplodia Zea*. Cultures of *D. Zea* grown on sterile maize produce clinical symptoms indistinguishable from those set up by feeding infected cobs.—*E. M. Doidge.*

2137. MITCHELL, D. T. Poisoning of cattle by feeding on *Paspalum dilatatum* infected with *Claviceps Paspali*. *South African Jour. Sci.* 16: 391-396. 1920.

2138. RUSSEL, G. A. Rose geranium. *Jour. Amer. Pharm. Assoc.* 10: 19-26. *1 pl.* 1921.—The results of experiments in the culture of several varieties of rose geranium (*Pelargonium odoratissimum*) in Florida since 1914. The discussion embraces such factors as growth of plants; propagation by cuttings; cultivation; fertilization; harvesting; distilling and yield of herb and oil. The yield of oil was somewhat disappointing, varying from 0.035 to 0.109 per cent, depending upon the time of harvesting. Heavy rains were noted to cause a decrease in yield of oil. One acre yielded 16,720 pounds of fresh herb the 1st year, 7,618 the 2nd, and 4,499 the 3rd; it appears, therefore, that the amount of fresh herb obtainable decreases with each year of the life of the field.—The yield of oil per acre is not sufficiently large to warrant the cultivation of geranium as a money crop. An approximation of the possible monetary returns is presented on the basis of price paid for lowest-priced oil:

	1917	1918	1919
A	\$36-57	\$22-25	\$10-93
B	21-75	23-76	14-92

The author believes that plot B very nearly represents what may be expected from the cultivation of rose geranium as a money crop.—*Anton Hogstad, Jr.*

2139. SCHNEIDER, ALBERT. A general method for making quantitative microanalyses of vegetable drugs and related substances. *Jour. Amer. Pharm. Assoc.* 9: 1140-1153. 1920.—The method consists in making a count of the characteristic elements present in the substance in question, from a diluted suspension of a carefully prepared powder. After carefully grinding and mixing, 1 gr. of substance is suspended in 5 or 10 cc. of distilled water or a mixture of water and glycerine in a 25 cc. graduated cylinder. It is then thoroughly mixed with a glass rod and the cylinder filled to the 25 cc. mark with 5 per cent gum acacia solution, the entire mixture being thoroughly mixed. (Other suspending materials may be used, such as glycerine, oils, thin syrup, solution of cherry gum, solution of gum mastic, gelatin solution, india gum solution, vaseline, etc.) Of the mixture, 0.2 cc. are delivered upon a counting chamber or counting slide. The characteristic tissue elements are then counted and recorded.

Between 30 and 50 distinct fields can be counted in one mount. These findings are then compared with a standard. A list of some 78 substances with characteristic tissue elements upon which counts are to be based are included; for example, Cinchona, large bast cells; Conval-laria, number of raphides; Absinthium, T-shaped trichomes.—*Anton Hogstad, Jr.*

2140. VIEHOEVER, ARNO. Chinese Colza. An adulterant of mustard seed. Jour. Amer. Pharm. Assoc. 10: 16-19. 3 pl. 1921.—The seeds of Chinese Colza, also known as "Golden Gate," which strikingly resemble white mustard, were offered for sale as mustard. The author has identified the Chinese Colza as *Brassica campestris chinoleifera* Viehoever. The taste is that of cabbage rather than mustard and they lack the necessary physiological characters. The fatty oil, however, can be used for technical purposes and undoubtedly, if properly re-fined, as an edible oil.—The volatile oil was present to the extent of 0.4-0.6 per cent and was identified as "crotonyl mustard oil." This oil is only slightly pungent and has the flavor of cabbage or turnip. It was found to be non-poisonous to rabbits and to lack the pronounced bactericidal properties of the true volatile oil of mustard. Analyses of the air dried seeds yielded 23 per cent protein, 11.5 per cent reducing substances, and over 40 per cent ether ex-tract. The press cake, which contains up to 10 per cent or more of fatty oil, should make a valuable feed product. The foliage should prove valuable as greens for salads, etc.—*Anton Hogstad, Jr.*

2141. YOUNGKEN, HEBER W. Pharmaceutical botany, a text book for students of pharm-acy and science. 3rd ed., 479 p., 238 fig. P. Blakiston's Son & Co.: Philadelphia, 1921.—The 1st chapter comprises 32 pages on fundamental principles of nomenclature, classification, and microtechnique. The life histories of important type forms, such as *Dryopteris Filix-mas*, *Pinus strobus*, and *Erythronium americanum*, etc., are taken up in detail. Vegetable cytology and plant tissues are discussed and illustrated by a number of new drawings. There are 98 pages dealing with plant organs and organisms. The morphology and histology of root, stem, and leaf are discussed and amply illustrated. Drawings of the various types of fruits and inflorescences are included. The portion devoted to taxonomy covers the plant kingdom from the primitive bacteria to the highest of the drug-yielding dicotyledonous fam-ilies, the Compositae. A chapter has been added on ecology, and a 24-page glossary defines the most important botanical terms used in the text.—*M. S. Dunn.*

PHYSIOLOGY

B. M. DUGGAR, *Editor*

CARROLL W. DODGE, *Assistant Editor*

(See also in this issue Entries 1589, 1590, 1814, 1827, 1830, 1869, 1937, 1959, 1973, 1978, 2007, 2023, 2047, 2049, 2134, 2217)

GENERAL

2142. ANONYMOUS. [Rev. of: BAYLISS, W. M. Principles of general physiology. xxiv + 858 p., 261 fig. Longmans, Green & Co.: London, 1918.] Sci. Prog. [London] 13: 507-508. 1919.

DIFFUSION, PERMEABILITY

2143. ADAIR, GILBERT SMITHSON. The penetration of electrolytes into gels. II. The application of Fourier's linear diffusion law. Biochem. Jour. 14: 762-779. 1920.

2144. LLOYD, DOROTHY JORDAN. Note on the production of a contracting clot in a gel of gelatin at the iso-electric point. Biochem. Jour. 14: 584-585. Pl. 1. 1920.—The conclusion is reached that gelatin gels are unstable at the iso-electric point. Small quantities of NaOH have the same stabilizing influence when added to the system as HCl. The formation of stable gels therefore is only possible in the presence of an electrolyte.—*A. R. Davis.*

2145. WIGGANS, R. G. Variation in the osmotic concentration of the guard cells during the opening and closing of stomata. *Amer. Jour. Bot.* 8: 30-40. 7 fig. 1921.—Determinations of the osmotic concentration of the guard cells and epidermal cells of *Zebrina pendula*, *Iresine*, *Cyclamen*, and the beet were made by placing pieces of the epidermis in calcium chloride solution of different densities and noting the concentration at which plasmolysis took place. There was little change in the osmotic concentration of the epidermal cells during the day. The concentration of the guard cells increased in the early hours of sunshine and decreased in the afternoon, approaching the concentration of the epidermal cells at nightfall. It was always higher in the guard cells than in the epidermis, though the differences were not as great as those reported by ILWIN. Concentrations were in all cases higher in experiments carried on at Columbia, Missouri, than at Ithaca, New York.—*E. W. Sinnott.*

WATER RELATIONS

2146. JOHNSTON, E. S. A method of studying the absorption-transpiration ratio in nutrient media. *Science* 52: 517. 1920.—Several writers have shown that the water content of plants varies with the hour of the day. Wilting takes place when the ratio of the rate of entrance to the rate of exit is less than unity, whether caused by excessive transpiration or by a decrease in root absorption. These 2 processes may be studied by using water culture plants exposed to different environmental conditions or placed in solutions of different osmotic pressures. An experiment is described to illustrate the manner in which changes in the strength of solutions affect the ratio of absorption to transpiration.—*A. H. Chivers.*

MINERAL NUTRIENTS

2147. HOAGLAND, D. R. Optimum nutrient solutions for plants. *Science* 52: 562-564. 1920.—The author raises the following questions: (1) Is it probable that the plant has any definite response, within broad limits, to a particular ratio of salts or ions contained in the complete nutrient solution? (2) Assuming the existence of such optimum solutions, are the methods generally employed adequate to determine their composition? It has been shown previously that often the total supply of nutrients may have limited the yield, and also the insolubility of iron, when added in the form of phosphate. In connection with the first point the following experiment may be suggestive: Three nutrient solutions were used with barley; (a) solution used by the author, (b) Shive's best solution, (c) Shive's best solution diluted to $\frac{1}{3}$ of the concentration in (b). Solutions (a) and (b) gave equally favorable growth, while the smaller yield from (c) is not necessarily significant. In this experiment solutions of radically different concentrations and salt proportions have not affected yield of crop to any important extent. Certain solutions may, of course, inhibit plant growth because of unfavorable physiological balance. Nevertheless, the range of equally favorable ratios between nutrient salts is probably a very broad one, no doubt including the solutions of most soils.—*A. H. Chivers.*

2148. JONES, HENRY WALLACE. The distribution of iron in plant and animal tissues. *Biochem. Jour.* 14: 654-659. 1920.—Making use in the main of Macallum's haematoxylin method, the writer finds that inorganic iron is quite widely distributed throughout animal and vegetable tissue, the lower organisms giving the reaction much more strongly than the higher. Aquatic animals contain more such iron than terrestrial, and foetal tissues more than adult. All nuclei show the reaction.—*A. R. Davis.*

2149. MCCALL, A. G., AND J. R. HOAG. The hydrogen-ion concentration of certain three-salt nutrient solutions for plants. *Soil Sci.* 10: 481-485. Fig. 1. 1920.—Using Gillespie's method of hydrogen-ion determination it was found that in general with any one type of 3-salt nutrient solution the hydrogen-ion concentration is a function of the proportion of KH_2PO_4 present. Types of solutions containing KH_2PO_4 have a lower hydrogen-ion concentration than those containing $\text{Mg}(\text{H}_2\text{PO}_4)_2$ or $\text{Ca}(\text{H}_2\text{PO}_4)_2$. The sulphates and nitrates play

minor parts in determining the reaction of the solutions. The variations in plant growth secured in these solutions cannot be correlated with differences in hydrogen-ion concentration.—*W. J. Robbins.*

2150. TAKE, BR. Die Entwicklung der Wurzeln und der Kalkgehalt des Bodens. [The development of roots and the lime content of the soil.] *Fühling's Landw. Zeitg.* 69: 58–59. 1920.—This note calls attention to the fact that investigations on the subject discussed by OSWALD in his article "Untersuchungen über die Einwirkung des Grundwasserstandes auf die Bewurzelung von Wiesenpflanzen auf Moorböden" published in this journal in 1919 (see Bot. Absts. 7, Entry 638) had been carried on some 20 years ago at the Moor Experiment Station at Bremen, the last mentioned results showing that root penetration is limited by the depth to which the soil is free of acidity.—*A. T. Wiancko.*

PHOTOSYNTHESIS

2151. MAZÉ, P. Recherches sur l'assimilation du gaz carbonique par les plantes vertes. [Investigations on the assimilation of carbon dioxide by green plants.] *Compt. Rend. Acad. Sci. Paris* 171: 1391–1393. 1920.—This is an attempt to give an experimental basis to the hypothesis of Bayer and Berthelot regarding the steps in the synthesis of sugar. Reactions were secured for the following substances in leaves during assimilation: acetylmethylcarbinol, hydrocyanic acid, glycolic aldehyde, and lactic aldehyde.—*Mrs. W. K. Farr.*

2152. WURMSER, RENÉ, ET MME. J. DUCLAU. Sur la photosynthèse chez les algues Floridées. [On the photosynthesis in red algae.] *Compt. Rend. Acad. Sci. Paris* 171: 1231–1233. 1920.—*Chondrus crispus* and *Rhodymenia palmata* were studied in a comparison of the rate of photosynthesis in green and red specimens of the same species. It was found that the red individuals are photosynthetically more active with a given amount of light. An analysis shows that the red individuals contain more chlorophyll than the green, while the lipochromes (xanthophyll and carotin) are present in about equal amounts.—*C. H. Farr.*

METABOLISM (GENERAL)

2153. ANONYMOUS. [Rev. of: ONSLOW, M. W. *Practical plant biochemistry.* iii + 178 p. Cambridge Univ. Press: Cambridge 1920 (see Bot. Absts. 8, Entry 602).] *Sci. Prog.* [London] 15: 498–499. 1921.

2154. ANONYMOUS. [Rev. of: RIDEAL, S., AND ASSOCIATES. *The carbohydrates and alcohol.* xv + 216 p., 11 fig. Baillière, Tindall & Cox: London, 1920.] *Sci. Prog.* [London] 15: 493–494. 1921.

2155. BAKER, J. L., AND H. F. E. HALTON. The iodimetric estimation of sugars. *Biochem. Jour.* 14: 754–756. 1920.—In general, the writers concur with JUDD (see Bot. Absts. 7, Entry 1312) in her favorable report of the WILSTÄTTER and SCHÜDEL iodimetric sugar method and suggest certain modifications in technique.—*A. R. Davis.*

2156. COURTONNE, H. De l'action contraire des chlorures et des sulfates solubles sur le matières amylacées. [On the opposite action of soluble chlorides and sulphates on starchy substances.] *Compt. Rend. Acad. Sci. Paris* 171: 1168–1170. 1920.—Chlorides change starch into amylopectin at ordinary temperatures and into soluble starch at 115°C. No swelling of starch occurred at 115°C. in a mixture of 65 parts $MgSO_4$, 40 parts of water, and 30 parts of starch.—*C. H. Farr.*

2157. COWARD, KATHERINE HOPE, AND JACK CECIL DRUMMOND. Researches on the fat-soluble accessory substance. IV. Nuts as a source of vitamin A. *Biochem. Jour.* 14: 665–667. 1920.—This investigation concerns a rat-feeding experiment in which Brazil, Barcelona, pea, walnut, almond, and butternuts were supplied as a source of vitamin A. These, although rich in fats, have low vitamin A values. This is additional evidence according to

the authors supporting the theory that vitamin A is formed in green tissues and not, in appreciable quantities at least, in seed and other resting tissues.—*A. R. Davis.*

2158. DELF, E. MARION. The distribution of accessory food factors (vitamines) in plants. *South African Jour. Sci.* 17: 121-125. 1920.—The accessory food factors or vitamins are widely distributed in the plant world and are associated with definite organs in the plant body. Seeds possess the water soluble and anti-neuritic accessory factor, but less abundantly than animal eggs. Green leaves possess both anti-scorbutic and fat-soluble vitamins in considerable amounts; the etiolated leaves of the white "heart" of a cabbage possess anti-scorbutic but no growth promoting qualities. Storage organs other than seeds contain chiefly the anti-scorbutic accessory factor. Succulent fruits contain the anti-scorbutic vitamin even before ripening is complete, and germinating seeds have considerable anti-scorbutic value even before the appearance of green leaves. Vitamins may thus be produced either in connection with photosynthesis or in connection with the deposition of reserves.—*E. M. Doidge.*

2159. DRUMMOND, JACK CECIL, AND KATHERINE HOPE COWARD. Researches on the fat-soluble-accessory substance. V. The nutritive value of animal and vegetable oils and fats considered in relation to their colour. *Biochem. Jour.* 14: 668-677. 1920.—The writers conclude that unless the existence of a leuco form is assumed, it does not appear probable that the fat-soluble vitamin belongs to the lipochrome pigment group, and the frequently observed association of the growth factor with such pigments must be regarded as accidental. As a class, animal fats possess greater growth-activating power than vegetable oils; but exceptions exist, and no hard and fast line can be drawn.—*A. R. Davis.*

2160. DRUMMOND, JACK CECIL, AND KATHERINE HOPE COWARD. Researches on the fat-soluble accessory factor (vitamin A). VI. Effect of heat and oxygen on the nutritive value of butter. *Biochem. Jour.* 14: 734-739. *Fig. 1-3.* 1920.—The results obtained are in accord with those reported by Hopkins (see *Bot. Absts.* 8, Entry 2191).—*A. R. Davis.*

2161. SCHERTZ, F. M. A chemical analysis of Sudan grass seed. *Bot. Gaz.* 69: 72-82. *1 fig.* 1920.—This paper reports an analysis of unhulled dry seeds, seeds after germination, and a microchemical analysis of the different parts of the seed. The results are given in tables, and comparison is made with analyses of other economic grasses.—*H. C. Cowles.*

2162. STEPHENSON, MARJORY. A note on the determination of the yellow plant pigments from the fat-soluble vitamin. *Biochem. Jour.* 14: 715-720. 1920.

2163. WAKEMAN, NELLIE A. Pigments of flowering plants. *Trans. Wisconsin Acad.* 19: 767-912. 1919 [1920].—The introductory chapter treats briefly of the theories of color in organic compounds, approaching them from the general point of view of absorption spectra. This is followed by an arrangement of the best known plant pigments according to a rational scheme of classification, that is, according to the degree of saturation based upon the underlying hydrocarbon. By means of this arrangement certain relationships, not otherwise easily observable, are emphasized, namely: (1) The influence of unsaturation in the molecule upon the production of color, (2) the influence of so-called chromophorous groups, (3) the existence of homologous series of plant pigments, and (4) the existence of series of pigments related to similar symmetrical, or almost symmetrical, hydrocarbons of different degrees of saturation.—*Nellie A. Wakeman.*

2164. WILLAMAN, J. J. Carbohydrate economy of cacti. [Rev. of: SPOEHR, H. A. The carbohydrate economy of the cacti. *Carnegie Inst. Washington Publ.* 287. 79 p. 1919 (see *Bot. Absts.* 3, Entry 1744).] *Bot. Gaz.* 69: 91-92. 1920.—This contribution is regarded as containing the most complete analysis of the carbohydrates of a single plant tissue that has been obtained.—*H. C. Cowles.*

2165. WILLAMAN, J. J. Plant mucilage. [Rev. of: LLOYD, F. E. Origin and nature of the mucilage in the cacti and in certain other plants. Amer. Jour. Bot. 6: 156-166. 1919 (see Bot. Absts. 3, Entry 442).] Bot. Gaz. 69: 96. 1920.

2166. ZILVA, SYLVESTER SOLOMON. The action of ozone on the fat-soluble factor in fats. Biochem. Jour. 14: 740-741. 1920.—The results show that ozone produces a more destructive effect upon the fat-soluble factors than was true with the aeration experiments of DRUMMOND and COWARD (see Bot. Absts. 8, Entry 2160) and HOPKINS (see Bot. Absts. 8, Entry 2191).—A. R. Davis.

METABOLISM (NITROGEN RELATIONS)

2167. BLUNCK, GUSTAR. Die Anpassung der Knöllchen-Bakterien an Nichtleguminosen. [The adaptation of nodule bacteria to non-leguminous plants.] Centralbl. Bakt. II Abt. 51: 87-90. 1920.—This is a preliminary report. The bacteria must first be adapted to overcome the external mechanical hindrances as well as the inhibiting ferments encountered after entering the plants. The bacteria were first grown on boiled root extract, or root-extract gelatine, the concentration of the extract being gradually increased. After adaptation to the root extract the organisms are grown on dead roots, but must still adapt themselves to the protective plant enzymes by increasing their own antibodies. Active root extract is prepared by grinding the clean, macerated plant roots into a paste by means of quartz sand. The extract is filtered through a Berkefeld filter into sterile containers. This extract is used in increasing amounts with gelatine as with the boiled extract. The medium is sterilized at 50°C. for 1 hour on each of 8 days. When gradually adapted to the activated, organized medium the bacteria are inoculated into living plants. The plants are brought into a state of hunger by culturing in quartz sand and watering with distilled water. The sap flow is lessened by diminishing heat and light.—Anthony Berg.

2168. BUCKNER, G. D., A. M. PETER, AND E. J. KENNEY. The concentration of sodium nitrate tolerated by tobacco plants. Soil Sci. 10: 487-491. 1920.—Wilted or unwilted tobacco plants about 10 inches long were placed in tap water containing varying quantities of NaNO_3 . Solutions containing more than 1 part of NaNO_3 to 3750 parts of tap water cause wilting. Concentrations of 150 parts of NaNO_3 to 3750 parts of tap water cause wilting which is more or less permanent. Solutions containing 2-3 parts of NaNO_3 to 3750 parts of tap water give the best general development.—W. J. Robbins.

2169. FEARON, WILLIAM ROBERT. A study of some bio-chemical tests. No. 2. The Adamkiewicz protein reaction. The mechanism of the Hopkins Cole test for tryptophane. A new color test for glyoxylic acid. Biochem. Jour. 14: 548-564. 1920.

2170. GERICKE, W. F. On the protein content of wheat. Science 52: 446. 1920.—Wheat of the Pacific coast states is conspicuously low in protein, due, it is commonly believed, to peculiar influences of climate. The author has investigated the effect of applications of NaNO_3 and $(\text{NH}_4)_2\text{SO}_4$ to plants at different growth periods. Glazed stone jars were filled with a soil low in nitrogen and planted with a pure strain of White Australian wheat. There were added 250 mg. of nitrogen per jar, that is, at the rate of 100 pounds per acre to different jars at different times during the growing period of the plants. A table shows a decided increase (about 77 per cent) in the protein content of wheat obtained from plants receiving nitrogen when 110 days old, over those treated with nitrogen at the time of planting. For each of the different applications of nitrate made after the time of planting there was a corresponding increase in the protein content of the wheat. It is concluded that the low protein content of Pacific Coast wheat is not due primarily to the climate, but to insufficiency of available nitrogen at certain growth periods of the plant.—A. H. Chivers.

2171. NOLTE, O. Düngungsversuche mit Harn. Über Reizwirkung von Kupfer- u. Quecksilberverbindungen. [Fertilizer tests with urine with special reference to the stimulating effect

of compounds of copper and mercury.] Fühling's Landw. Zeitg. 69: 141-144. 1920.—This is a report of progress in an investigation of the effect of additions of copper and a combination of copper and mercury to urine upon the growth of mustard. A substantial increase is found in the efficiency of the urine with the addition indicated over the untreated urine.—A. T. Wiancko.

2172. SCHMIDT, ERNST WILLY. Notiz über das Vorkommen von Volutin bei *Azotobacter chroococcum*. [Notes on the occurrence of volutin in *Azotobacter chroococcum*.] Centralbl. Bakt. II Abt. 50: 44-45. 1920.—The author confirms the former work of FISCHER that volutin occurs in the older cells of *Azotobacter chroococcum* and refutes the work of PRAZMOWSKI, which did not confirm Fischer's results.—Anthony Berg.

2173. WANN, FRANK B. The fixation of free nitrogen by green plants. Amer. Jour. Bot. 8: 1-29. 1 pl., 1 fig. 1921.—Seven species of Chlorophyceae were grown in pure cultures on mineral nutrient agar for periods of from 165 to 297 days. Nitrogen was supplied in the form of nitrates in some cases and in the form of urea, glycocoll, asparagine, and ammonium sulphate in others. Some cultures were supplied with glucose and others were not. Analyses for total nitrogen in the culture media were made at the end of the experiment.—When nitrates were used as a source of nitrogen, and when glucose was also present, all the species showed ability to fix the free nitrogen of the atmosphere, the amounts of fixation representing increases in the total nitrogen content of the culture flasks of from 4 to 54 per cent. A comparison of these results with those reported by other workers for legume bacteria and *Azotobacter* shows that the algae fix fully as much nitrogen per unit volume of medium as do these bacteria.—Five species were grown in the presence of nitrates but without glucose. A very slight increase in the nitrogen content was found in these cases, and the author believes that some fixation took place here. He suggests that the very poor growth made in such cultures may explain the small amount of fixation.—When nitrogenous compounds other than nitrates were supplied as a source of nitrogen, no fixation whatever was obtained, either in the presence or absence of glucose. One case of apparent denitrification is reported.—E. W. Sinnott.

2174. WHITING, ALBERT L., AND WARREN R. SCHOONOVER. Nitrogen fixation by cowpeas and nodule bacteria. Soil Sci. 10: 411-420. 1920.—Analyses were made of inoculated and uninoculated cowpeas planted in nitrogen-free sand and furnished with nitrogen-free mineral salts and water. A comparison of the nitrogen content of the inoculated plants with that of the seeds or uninoculated plants shows that a marked fixation of nitrogen occurs shortly after the formation of the first true leaf. This in 3 experiments was 19 days after planting. The first appearance of nitrogen fixation was 9 days after planting. At the end of 26 days after planting the nitrogen fixed was 3 times that contained in the original seed. Tests with diphenylamine and brucine, with α -naphthylamine sulphanilic acid, and with Nessler's solution failed to show nitrate, nitrite, or ammonia in the inoculated seedlings. Inorganic nitrogen of these forms is not concerned in symbiotic fixation by legumes and nodule bacteria.—W. J. Robbins.

METABOLISM (ENZYMES, FERMENTATION)

2175. BOKORNY, TH. Hefeernährung und Gärung. Gibt es eine Hefeentwicklung ohne Zuckervergärung? [Yeast nutrition and fermentation. Can growth of yeast take place without fermentation of sugar?] Centralbl. Bakt. II Abt. 50: 23-33. 1920.—The rôle of alcoholic fermentation in the life of the yeast plant is discussed. Alcoholic fermentation is not essential, and the yeast plant can grow in the absence of fermentable sugar; fermentation occurs, however, whenever possible, and serves to render the medium unsuitable for the development of competing microorganisms.—M. A. Raines.

2176. BORKOWSKI, R. Beitrag zur Kenntnis des Oxydations-vermögens der Wurzeln der höheren Pflanzen. [The oxidizing powers of the roots of higher plants.] Landw. Versuchssta.

94: 265-284. 1919.—Experiments on various species of plants with .05 and .01 per cent solutions of ammonium-ferrosulphate showed that the roots possess considerable powers of oxidizing the iron. It was found that the oxidizing ability is localized in the regions of the root hairs and at the growing tips. Within the root tissues, the separation of iron takes place in the central cylinder and especially in the wood bundles on the inner walls of the vessels and in the adjoining hadrome parenchyma cells; also in the interior of the tissues of the root tip. Considerable differences were found in the oxidizing ability of the different plants tested, according to the extent of their root systems. The weakest in this respect was *Sinapis* and the highest *Phaseolus*, with *Triticum*, *Cannabis*, *Lupinus*, and *Pisum* ranging between, in the order named. *Triticum*, and to a certain extent *Sinapis* and *Cannabis*, showed their highest oxidizing ability in the earlier stages of growth, while *Phaseolus*, *Pisum*, and *Lupinus* showed their greatest oxidizing ability in the later stages of growth. The oxidizing capacity of roots is related in a practical way to the oxidation processes in the soil.—A. T. Wiancko.

2177. KOPELOFF, NICHOLAS. The prevention of sugar deterioration by the use of superheated steam in centrifugals. Louisiana Planter and Sugar Manufacturer 65: 189-190. Fig. 1. 1920.—By using superheated steam in the centrifugals to wash the sugar, 92-99.5 per cent of the bacteria and mold spores are killed. This improves the keeping quality of both the sugar and the molasses.—C. W. Edgerton.

2178. LAUPPER, G. Die neuesten Ergebnisse der Heubrandesforschung. [Results of recent investigations on the heating of hay.] Landw. Jahrb. Schweiz 1920: 1-54. Fig. 1-5. 1920.—This gives a detailed account of the physiological changes occurring in the heating of hay in the stack. Citations (65) of the literature are appended.—J. D. Luckett.

2179. McDOWALL, R. J. S. A review of recent work on enzyme action. Sci. Prog. [London] 15: 406-434. 1921.—A review of the more recent literature dealing with the nature and action of enzymes is given. The work done in the various phases of this subject is correlated, and from the indications of recent work there are pointed out the lines along which solutions of many of the problems may be found.—J. L. Weimer.

2180. ONSLOW, MURIEL WHELDAL. Oxydizing enzymes. II. The nature of the enzymes associated with certain direct oxidizing systems in plants. Biochem. Jour. 14: 535-540. 1920.—This paper deals with the relation of a substance with catechol grouping to the oxidase system. Solutions of various substances having this grouping, such as catechol, caffeic acid, protocatechuic acid, adrenaline, etc., were found to oxidize slowly in air with the formation of peroxides. A solution of peroxidase added to such peroxides completes an oxidase system, which will blue guaiacum. The autoxidation noted above as concerns catechol, protocatechuic acid, and caffeic acid is accelerated by enzyme extracts of plants which turn brown on injury and the juices of which blue guaiacum without the addition of H_2O_2 . In a previous communication, such plants were shown to contain a compound with the "catechol" grouping and the writer suggests here that they may contain, in addition, a second enzyme, for which she tentatively adopts Bach and Chodat's term, "oxygenase." The function of the latter is to catalyse the autoxidation of the catechol compound with the formation of a peroxide. In the case under discussion, 3 components are considered as making up the oxidase system,—a catechol compound from which a peroxide can be formed, and 2 enzymes, an oxygenase which catalyses the production of a peroxide, and a peroxidase which decomposes the peroxide with the formation of active oxygen. All 3 components are necessary for the bluing of guaiacum.—A. R. Davis.

2181. ONSLOW, MURIEL WHELDAL. Oxidizing enzymes. III. The oxidizing enzymes of some common fruits. Biochem. Jour. 14: 541-547. 1920.—Enzyme action in plant tissue may be difficult of demonstration due to the presence of certain inhibitors as well as to faulty technique. Best results are usually obtained when the tissue is placed directly in the reagent. When tissue extracts are employed action may be modified by (1) failure to extract the enzyme

and (2) the relative concentration of enzymes, sugars, organic acids, and tannins in extracts being different from that existing *in situ*. If inhibitors are present, they must be removed. The following technique was employed by the author: (a) *Reaction of tissues*. Pieces of tissue were placed directly in the reagents,—alcoholic solution of guaiacum, 1 per cent solution benzidine in 50 per cent alcohol with H_2O_2 , 1 per cent α -naphthol in 50 per cent alcohol with H_2O_2 . (b) *Reaction of water extract*. Water extract of pounded tissue was tested in above reagents, and if acid it was neutralized to litmus. (c) *Reaction with extracts of enzymes*. Sugars, tannins, etc., were extracted from pounded tissue with 96 per cent alcohol and the enzyme extracted from the residue with water. This was tested for peroxidase with guaiacum and H_2O_2 , and for oxygenase with catechol and guaiacum. (d) *Extraction of aromatic compounds and their reaction with enzyme extract*. Employing methods outlined above, the following fruits were tested for oxidizing enzymes: Apple, quince, pear, plum, banana, orange, lemon, lime, and raspberry. The apple, pear, quince, and plum were found to contain an oxidase (peroxidase, oxygenase, and aromatic substance with catechol grouping). Both skin and flesh of banana contained peroxidase and oxygenase; the orange, lemon, and lime contained peroxidase in rind and pulp, but no oxygenase and no substance giving the catechol reaction. Raspberry fruit gave similar results.—A. R. Davis.

METABOLISM (RESPIRATION, AERATION)

2182. BERGMAN, H. F. The effect of cloudiness on the oxygen content of water and its significance in cranberry culture. Amer. Jour. Bot. 8: 50–58. 3 fig. 1921.—A study of the oxygen and CO_2 content of pond and bog water used in flooding cranberry bogs was made in Wisconsin and Massachusetts. In general, it was found that oxygen was more abundant and CO_2 less abundant (1) during the latter part of the day as compared with the morning, and (2) during clear days as contrasted with cloudy ones. Under the following conditions, namely, (1) clear, sandy bottom pond, (2) muck-bottom pond, and (3) discolored water of a bog ditch, there were, in the order given, more oxygen and less CO_2 and much less variation in the content of these 2 gases. It is suggested that the photosynthesis and respiration of plants and the oxidation of organic matter are responsible for the amount of these gases present and that differences in light intensity, amount of vegetation, and amount of organic matter produce the differences observed. Experiments are cited in which cranberry plants, submerged in tubs of either pond or ditch water, were injured by shading, while unshaded plants under otherwise similar conditions were not injured. The oxygen content in the unshaded tubs was much reduced. Respiration (and thus the need of oxygen) was found to be much more rapid in flowers and growing tips of cranberry plants than in old shoots. The injury to growing tips which frequently follows flooding the bogs is thought to be due to deficiency of oxygen in the water. Such injuries are more likely to occur if water full of organic matter is used or if flooding is done in cloudy weather.—E. W. Sinnott.

2183. PIÉDALLU, ANDRÉ, PHILIPPE MALVEZIN, ET LUCIEN GRANDCHAMP. Action de l'oxygène sur les moûts de raisins rouges. [The effect of oxygen on the wine from red grapes.] Compt. Rend. Acad. Sci. Paris 171: 1230–1231. 1920.—Oxygen is found to change the color of the solution to a white or a rose if allowed to diffuse through a porous plate, thus no decolorizing chemicals are necessary.—C. H. Farr.

ORGANISM AS A WHOLE

2184. LIESEGANG, RAPHAEL ED. Gegenseitige Wachstumshemmung bei Pilzkulturen. [Mutual antagonism in fungus cultures.] Centralbl. Bakt. II Abt. 51: 85–86. Fig. 1. 1920.—The author attributes the gaps that appear between approaching colonies in the well-known phenomenon of "growth antagonism," to a deficiency of an essential nutrient. This nutrient, which must be essential for both approaching colonies, has diffused in the direction of the growing colonies and no longer exists in sufficient amount to sustain growth. The author has reproduced an analogous phenomenon by using silver nitrate gelatine upon which drops of sodium chloride are placed.—Anthony Berg.

2185. PRINGSHEIM, E. G. Über die gegenseitige Schädigung und Förderung von Bakterien. [The mutual injury and stimulus between bacteria.] Centralbl. Bakt. II Abt. 51: 72-85. 1920.—Methods are suggested for the study of the effects of 2 cultures of bacteria growing together. *Bacillus mesentericus vulgatus* on the same plate with *B. diphtheriae* inhibits the growth of the latter, so that even 8-10 colonies of the former will repress entirely the growth of *B. diphtheriae*. In addition to the injurious action *B. mesentericus vulgatus* also exerts a stimulating action on *B. diphtheriae* as indicated by the formation of giant colonies of *B. diphtheriae* in the zone of influence of the former. The substance produced by *B. mesentericus vulgatus* is a thermolabile poison which stimulates in small doses and injures in large ones. Other spore formers of the hay bacillus group, 8 of which were tested, did not exert the same antagonistic action. *B. coli* and *B. paratyphosus A* were not affected by *B. mesentericus vulgatus*. The action of various bacteria on *B. influenzae*, on the gonococcus, and on certain anaerobes was also studied.—Anthony Berg.

2186. ROCKWELL, G. E., AND C. F. MCKHANN. The growth of the gonococcus in various gaseous environments. Jour. Infect. Diseases 28: 249-258. 1921.—This is a study of the growth of *Gonococcus* under the influence of hydrogen, oxygen, and carbon dioxide. It is suggested that the fact that bacteria are aerobic, partial tension, anaerobic, or facultative in their respiratory requirements is an expression of their previous gaseous adaptation.—Selman A. Waksman.

GROWTH, DEVELOPMENT, REPRODUCTION

2187. CROCKER, WILLIAM. Germination. [Rev. of: RUSSELL, G. A. Effect of removing the pulp from camphor seed on germination and the subsequent growth of the seedling. Jour. Agric. Res. 17: 223-238. 1919 (see Bot. Absts. 3, Entry 2900).] Bot. Gaz. 69: 96. 1920.

2188. GOERTZ, OTTO. Untersuchungen über die Haustorienbildung bei *Cuscuta*. [Studies on haustorium formation in *Cuscuta*.] Centralbl. Bakt. II Abt. 51: 287-313. 1920.—Experiments are described checking and extending our knowledge of the irritability factors involved in the production of haustoria by *Cuscuta*. The form worked with was *C. Gronovii* Willd., an American species found parasitizing *Impatiens parviflora* DC. in the botanic garden at Leipzig. Haustoria can be produced on any aspect of the surface of the shoot, although the inner or concave side seems to exhibit a higher predisposition in this respect; production of haustoria on the convex or outer face of the stem was induced by allowing the latter to twine within a glass tube. The dodder shoot must be actively growing. Mere contact with a solid body, without a certain amount of pressure, is not sufficient to cause the production of haustoria, as was indicated by attaching sand grains to the shoot by means of paraffine oil. No haustoria are produced after flowering begins. Both twining and haustorium production are inhibited on the klinostat. Contact with liquids will not induce haustorium production though submerged plants may produce haustoria. A dodder plant lived 14 days under water twining around and parasitizing a shoot of *Myriophyllum*. Exposure to radium emanations inhibited all growth activity.—M. A. Raines.

2189. KRAUS, E. J. The modification of vegetative and reproductive functions under some varying conditions of metabolism. Amer. Jour. Bot. 7: 409-416. 1920.—The author discusses certain factors which tend to cause a development of vegetative organs in the plant and others which stimulate reproduction. The early idea that the 2 functions are antagonistic and that nitrogen stimulates only the former and potash and phosphorus the latter is now recognized as incomplete. These 2 functions now seem instead to depend upon the relationship between available nitrogen and the plant's supply of carbohydrates. If the former is abundant and the latter scanty (as in plants with reduced leaf surface or growing in poor light) the result is a plant vegetatively weak and with few or no reproductive organs. If both nitrogen and carbohydrates are abundant, however, there is vigorous vegetative development but little sexual reproduction. If nitrogen is limited in relation to carbohydrates, the latter will not

all be used in vegetative extension and can accumulate, with the result that the plant is vigorous and fruitful. Finally, if nitrogen is still further reduced, carbohydrate reserves accumulate in abundance but the plant is weak vegetatively and reproduces but little. The rôle of other chemical elements and of water, light, temperature, and hereditary factors in this problem are also doubtless important and should be thoroughly studied. The author points out the importance in such a problem as this of obtaining a large body of chemical analyses of the plants to be studied, made upon the various tissues and organs and at successive intervals during the year.—*E. W. Sinnott.*

TEMPERATURE RELATIONS

2190. GERICKE, W. F. Influence of temperature on the relations between nutrient salt proportions and the early growth of wheat. *Amer. Jour. Bot.* 8: 59-62. 1921.—Wheat seedlings were grown in the 126 3-salt solutions described by the committee on salt requirements, and at 2 different temperatures, 23°C. (approximately the optimum) and 17°C. (considerably below the optimum). It was found that the best growth at the lower temperature was produced when the proportion of potassium was high and of H_2PO_4 low; and at the high temperature when the proportion of potassium was low and of H_2PO_4 high. Temperature is thus important as a factor in determining what are the mineral requirements for good germination and initial growth in wheat.—*E. W. Sinnott.*

2191. HOPKINS, FREDERICK GOWLAND. The effects of heat and aeration upon the fat-soluble vitamine. *Biochem. Jour.* 14: 725-733. *Fig. 1-4.* 1920.—The experiments conducted show that although fat-soluble A of butter displays considerable resistance to heat alone at temperatures up to 120°C., it is readily destroyed by simultaneous aeration of the fat.—*A. R. Davis.*

2192. JÖRGENSEN, I., AND WALTER STILES. Some scientific aspects of cold storage. *Sci. Prog. [London]* 13: 614-620. 1919.—The authors outline some of the problems involved in studying the cold storage of foods. Some changes which take place in stored fruits are discussed.—*J. L. Weimer.*

2193. WINGE, Ö. A practical form of thermostat aquaria heated by electricity. *Compt. Rend. Trav. Carlsberg Lab. [København]* 14^{no}: 1-4. 1920.—This form of thermostat aquarium has been in successful use at this laboratory for several years and has been of value in giving aquatic organisms homogeneous conditions and in studying the effect of different degrees of temperature on their activity. Heating units are placed underneath the tank and these are insulated from the air. A mercury contact thermo-regulator operates a switch in the heating circuit by means of a relay. The essential feature of this switch is a sealed glass tube containing 2 drops of mercury connected electrically by the armature of the relay which floats upon them; when the armature is raised contact is broken. An automatically operating air chamber for ventilation is provided.—*F. Weiss.*

2194. ZIKES, HEINRICH. Über den Einfluss der Temperatur auf verschiedene Functionen der Hefe. [The influence of temperature on various functions of yeasts.] *Centralbl. Bakt.* II Abt. 50: 385-410. *Fig. 5.* 1920.—The budding activity of yeasts is more or less dependent on those temperatures at which it was previously grown and to which it has adapted itself. "Cold" yeasts, that is, yeasts formerly grown at low temperatures, show a much more rapid growth (likewise more rapid ascospore formation) at all low temperatures than do cells of the same species grown at a higher temperature, and conversely. Some yeasts are more irritable in this respect than others. Cold yeasts adapt themselves more easily to higher temperatures than high temperature yeasts to lower temperatures. The formation of fat (in the fat granules) takes place very slowly at low temperatures (12-15°C.) and more rapidly at high temperatures (20-30°C.). A secondary development of small fat globules occurs very abundantly at low temperatures. *Mycoderma cerevisiae* is a weak glycogen former; likewise *Torula alba* and *Willa Anomaia*. In *Chalara mycoderma* variations in temperature

seem to have little influence on the formation of glycogen. The optimum for the formation of glycogen in brewer's yeast is around 30°C. Cells kept at high temperatures for some time and then forced to adapt themselves to low temperatures showed a very low rate of propagation (20-30 cells in 3 days) while yeasts of the same species grown at high temperatures for some time produced 300,000-350,000 cells in the same period. The formation of esters is slower at lower temperatures (10°C.) than at higher temperatures (30°C.). The shape of the cells is influenced by variations in temperature; the former shapes being assumed, however, when subsequently grown at optimum temperatures. In pigment producers the production of coloring matter is most pronounced at low temperatures. Giant colonies show only gradual changes with variations in temperature, but are raised above the substratum much more when grown at low temperatures. Softening and liquefaction of yeasts takes place more rapidly as the temperature increases. In determinations of the thermal death point *Willa saturnus*, *Schizosaccharomyces Pombe*, *Saccharomyces Logos*, and *Saccharomyces thermantitonus* were found more resistant.—Anthony Berg.

RADIANT ENERGY RELATIONS

2195. RUSS, SIDNEY. Growth and division of cells as affected by radiation. *Sci. Prog.* [London] 13: 605-613. 1919.—This is a discussion of the effect of x-rays on the growth of tumors, with special reference to the susceptibility of the cells in different stages of growth to radiation.—J. L. Weimer.

TOXIC AGENTS

2196. HARDEN, ARTHUR, AND FRANCIS ROBERT HENLY. The effect of pyruvates, aldehydes, and methylene blue on the fermentation of glucose by yeast juice and zymine in presence of phosphate. *Biochem. Jour.* 14: 642-653. *Fig. 1-2.* 1920.—The investigators take as a thesis the fact noted by various workers that α -ketoacids and aldehydes have an activating effect upon yeast fermentation, particularly at the commencement of the reaction, and that this effect has been noted especially in experiments made with maceration extract containing a large amount of mineral phosphate. The question arose as to whether this was a general stimulation effect or a more specialized acceleration of the reaction in the presence of free mineral phosphate. In general, the results show no marked activation following the addition of aldehydes to fermenting mixtures of yeast juice or zymine with glucose. If a suitable amount of phosphate be added, the effect of the aldehyde is to greatly diminish the time required for the maximum gas production, and likewise a higher maximum is attained. On completion of the esterification of the phosphate, the rate again diminishes both in the presence and absence of aldehyde and the total evolution is not greatly different in the 2 cases. Similar effects were obtained with pyruvates. The effect varies with the concentration of the aldehyde and is common to, but not equal in, the 4 aldehydes tested, formic, acetic, propionic, and butyric. The results suggested an effect due to a lack of an acceptor for hydrogen. Methylene blue, readily reducible by hydrogen, produced the same effects as the aldehydes. In the light of these results, the final stage of alcoholic fermentation of sugar is held to be the reduction of the acetaldehyde produced by the decomposition of pyruvic acid, the production of this latter from sugar being only possible when some acceptor for hydrogen is available. This acceptor is normally supplied by acetaldehyde produced at a later stage of the reaction.—A. R. Davis.

2197. WILLAMAN, J. J. Toxicity of alpha-crotonic acid. [Rev. of: SKINNER, J. J., AND F. R. REED. The influence of phosphates on the action of alpha-crotonic acid on plants. *Amer. Jour. Bot.* 6: 167-180. 1919 (see *Bot. Absts.* 3, Entry 437).] *Bot. Gaz.* 69: 96. 1920.

MISCELLANEOUS

2198. CARLES, PIERRE. Sur la casse bleue des vins. [The "blue cassia" of wine.] *Compt. Rend. Acad. Sci. Paris* 169: 1422-1423. 1919.—The treatment of this so-called "disease" of wine by the addition of an organic acid, either tartaric or citric, is recommended.—R. W. Webb.

trichum commune L. [Spore dissemination in *Polytrichum commune* artificially induced.] Hedwigia 60: 350-351. 1919.—If mature capsules of *Polytrichum commune*, deprived of their opercula, are immersed in ether, the spores are set free through the minute openings between the peristome and the epiphragm. The ether dissolves the layer of wax on the outside of the spore-case, and this is followed by a contraction of the internal parts of the capsule. The extrusion of the spores, which is at first violent and accompanied by a distinct crackling sound, gradually slows down.—A. W. Evans.

2200. PIÉDALLU, ANDRÉ. Sur le rôle du fer dans la casse bleue des vins. [The rôle of iron in "blue cassia" of wine.] Compt. Rend. Acad. Sci. Paris 169: 1108-1109. 1919.—The term "casse bleue" is applied to a "disease" of wine, and the author finds that this frequently appears in wine that has been previously transported in wagon-casks made of iron. Among the phenomena accompanying this disease are the deposition of the coloring matter of the wine on the sides and bottom of the containing vessels and the appearance of an iridescent veil on the surface. The indications are that the "disease" is induced by the presence of ferric salts. Control methods are suggested.—R. W. Webb.

2201. VAN ALSTINE, ERNEST. The determination of hydrogen-ion concentration by the colorimetric method and an apparatus for rapid and accurate work. Soil Sci. 10: 467-479. Pl. 1, fig. 1-2. 1920.—A colorimeter is described consisting of an eyepiece and wooden blocks holding the standard tubes and the unknown solutions which slide before it. The blocks holding the tubes may have 1, 2, or 3 series of holes and tubes, depending upon whether single tube standards, double tube standards, or double tube standards and turbid solutions are used. A graph and table prepared by calculation are given which permit the preparation of double tube standards having any desired P_H between 2 and 10.—W. J. Robbins.

SOIL SCIENCE

J. J. SKINNER, *Editor*

F. M. SCHERTZ, *Assistant Editor*

(See also in this issue Entries 1584, 1585, 1586, 1589, 1607, 1614, 1624, 1816, 1958, 1963, 1977, 2150, 2174, 2176, 2190)

2202. ANONYMOUS. [Rev. of: COLLINS, S. H. Chemical fertilizers and parasitocides. xii + 273 p., 8 fig. Ballière, Tindall & Cox: London, 1920.] Sci. Prog. [London] 15: 494-495. 1921.

2203. ANTONIADIS ET MAUME. Essais avec la cyanamide de calcium. [Experiments with calcium cyanamid.] Ann. École Nation. Agric. Montpellier 17: 120-130. Fig. 1. 1918 [1919].—Pot culture experiments showed that calcium cyanamid is clearly toxic when incorporated in the soil at the time the grain is sown. When incorporated some time before the seed is sown (at least 15 days) calcium cyanamid loses its toxicity, but the seedlings are inferior to those grown in control plots. A study of the effect of calcium cyanamid on different types of soils is contemplated.—F. F. Halma.

2204. BAGULEY, A. Building up the fertility of the soil. Jour. Dept. Agric. Union of South Africa 1: 755-759. 1920.—Improving the productivity of soil by supplying humus, lime, nitrogen, potash and phosphoric acid is discussed and also the common chemicals used in commercial fertilizers.—Lyman Carrier.

2205. BIPPART, E. Zum Wasserhaushalt des Bodens. [Water relations of soils.] Mitteil. Deutsch. Landw. Ges. 35: 330-331. 1920.

2206. CROCKER, WILLIAM. Heated soils. [Rev. of: JOHNSON, JAMES. The influence of heated soils on seed germination and plant growth. Soil Sci. 7: 1-87. 1919 (see Bot. Absts.

3, Entry 854).] *Bot. Gaz.* 69: 94-95. 1920.—This is regarded as "a very critical and exhaustive piece of work." The "results are valuable in elucidating the effects of sterilizing soils by heat."—*H. C. Cowles.*

2207. DACKNOWSKI, ALFRED P. Peat deposits in the United States and their classification. *Soil Sci.* 10: 453-465. 1920.—A review of literature dealing with the extent and systems of classifying peat deposits.—*W. J. Robbins.*

2208. FRAPS, G. S. Composition of the soils of Archer, Franklin and Harris counties. *Texas Agric. Exp. Sta. Bull.* 244. 78 p. 1919.—The area of each soil type occurring in the 3 counties is given together with the amount of plant food each contains. Each soil is described and its needs suggested. The results of pot experiments on the various soils are given and methods of maintaining soil fertility discussed.—*L. Pace.*

2209. FRAPS, G. S. The needs of Texas soils for lime. *Texas Agric. Exp. Sta. Bull.*, 243. 18 p. 1919.—A general discussion of the effects of lime in which it is pointed out that lime affects the physical character of the soil, aids in the retention of water, and makes phosphoric acid more available. Experiments are cited which show that it does not render potash more available. Lime aids in making the nitrogen content of the soil more available, resulting in more rapid impoverishment of soils. As a rule, lime should not be used on alkali soils as the carbonates formed are more injurious than the alkali. Sources of lime for agricultural uses are discussed and methods of applying are described.—The distribution of acid soils in Texas is given.—*L. Pace.*

2210. HASENBÄUMER, J. Einfluss der Bodenreaktion auf die Düngung und Fruchtbarkeit der Kulturböden. [Influence of the soil reaction on fertilizing and on the productivity of the soil.] *Mitteil. Deutsch. Landw. Ges.* 36: 80. 1921.—The author calls attention to the damage to plants from an acid soil and suggests the following method for determining the relative acidity of soils. Thirty grams of soil are shaken for 1 hour with 100 cc. 7.5 per cent solution of KCl. To 10 cc. of the filtrate 4-5 drops methyl red are added. After violent shaking the color will be lilac if the reaction is very strongly acid, carmine if strongly acid, cinnabar red if acid, orange if weakly acid, and yellow if neutral or alkaline. In the last case 10 cc. of filtrate should be used with 5 drops of Azolieuim. If the solution becomes pure blue without a trace of violet or red the soil is strongly alkaline.—*A. J. Pieters.*

2211. HERMANN. [Rev. of: LOEW, OSKAR. Ueber die Bedeutung des Kalkes für die Ernährung der Pflanzen, Tiere und Menschen. (The significance of lime in the nourishment of plants, animals, and man.) *Naturwiss. Zeitschr. Forst- u. Landw.* 16: 309. 1918.] *Forst. Rundschau* 20: 27-28. 1919.

2212. JURITZ, CHAS. F. The agricultural soils of the Union. A summary of existing knowledge. *South African Jour. Indust.* 4: 76-84. 1921.

2213. LEACH, B. R. A study of the behavior of carbon disulfide when injected into the soil and its value as a control for the root form of the woolly apple aphid. *Soil Sci.* 10: 421-451. *Pl.* 1-2, *fig.* 1-8. 1920.—By using buried pieces of roots infected with woolly aphid it was found that the moisture content of the soil limits the effective diffusion of CS_2 . It cannot be applied effectively when conditions are favorable for killing the aphid without injuring the roots.—*W. J. Robbins.*

2214. LEMMERMANN, O., UND L. WICHERS. Über den periodischen Einfluss der Jahreszeit auf den Verlauf der Nitrifikation. [Seasonal influence on the rate of nitrification.] *Centralbl. Bakt.* II Abt. 50: 33-43. 1920.—An experiment is described in which parallel analyses for nitrates were made monthly for 12 months of samples of soil from the field, and from a quantity of similar soil kept in the laboratory under constant temperature and moisture conditions. The curves for the 2 series of tests practically coincide, exhibiting maxima in April and July.—*M. A. Raines.*

2215. MARCHAND, B. DE C. Chemical analysis of soils. Jour. Dept. Agric. Union of South Africa 1: 341-348. 1920.—The author annotates in detail the information contained in a "complete soil analysis" and in a partial analysis to determine manurial needs.—*E. M. Doidge*.

2216. MARCHAND, B. DE C. Representative Transvaal soils 1. The Koedoespoort Red Loam. Jour. Dept. Agric. Union of South Africa 1: 722-727. 1920.

2217. MÜNTER, F. Die Zuckerrübe als Boden analysatorim. [The sugar beet as soil analyzer.] Mitteil. Deutsch. Landw. Ges. 35: 313-314. 1920.—The author points out that while a chemical analysis of plants generally does not yield information of value regarding the fertility of the soil, the sugar beet may be used in a limited way to determine whether or not potassium or phosphoric acid is present in the soil in sufficient quantities. From tables of analyses he concludes that if, on soil in which there is ample nitrogen, the percentage of potash in the plant exceeds that of nitrogen, there is sufficient potash in the soil; if it is less, there is not enough for the plants. If, on similar soil, the ratio of nitrogen to phosphoric acid is greater than 100:20, phosphoric acid is needed; if the ratio is less, phosphoric acid is present in sufficient quantity.—*A. J. Pieters*.

2218. SMIT, B. J. Representative Transvaal soils, II. Pretoria quartzite sandy soils. Jour. Dept. Agric. Union of South Africa 2: 170-176. 1921.

2219. STEAD, ARTHUR. The agriculture and soils of the Cape Province, 1. Jour. Dept. Agric. Union of South Africa 1: 152-153. Pl. 1-2, map. 1920.—An account is given of the Witkop district in the Stormburgen, with reference to its climatic conditions, potato and wheat culture, and principal types of soils.—*E. M. Doidge*.

2220. STEAD, ARTHUR. The agriculture and soils of the Cape Province IV. Witkop Burghersdorp. Jour. Dept. Agric. Union of South Africa 1: 660-670. Pl. 6-7. 1920.

2221. STEAD, ARTHUR. The agriculture and soils of the Cape Province V. Witkop-Burghersdorp. Jour. Dept. Agric. Union of South Africa 1: 819-828. Pl. 8-10. 1920.

2222. STEAD, ARTHUR. Brak in its relation to irrigation. Jour. Dept. Agric. Union of South Africa 1: 13-25. Pl. 1-4. 1920.—Where the rainfall is so light that irrigation is necessary the soil contains more or less brak. Directions are given for the irrigation of brak soils, and for the use of brak waters in irrigation. Crops which are deep rooted and which shade the land are best for brak lands because they prevent evaporation at the surface.—*E. M. Doidge*.

2223. THOMPSON, H. C. Experiments with muck soils in growing greenhouse crops. Jour. Amer. Peat Soc. 14: 45-63. 1921.—Lettuce, cauliflower, tomatoes, carnations, and roses were used to test muck as a greenhouse soil. A chemical analysis does not give any indication of the crop-producing capacity of a muck soil.—*G. B. Rigg*.

2224. WEIGNER, GEORG. Boden und Bodenbildung in kolloidchemischer Betrachtung. [Soil and soil formation in the light of colloidal chemistry.] 15 x 22 cm., 98 p., 10 fig. Theodor Steinkopff: Dresden and Leipzig. 1918.—A general treatise on the subject, reviewing the late developments in colloidal chemistry and applying the principles of colloidal chemistry to soil formations.—*J. J. Skinner*.

TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, *Editor*E. B. PAYSON, *Assistant Editor*

(See also in this issue Entries 1604, 1655, 1695, 2006, 2009)

GENERAL

2225. BLACK, J. M. Additions to the flora of South Australia. No. 15. Trans. and Proc. Roy. Soc. South Australia 43: 23-44. Pl. 6-8. 1919.—Three species are included which are believed to be new to science. They are described under the names *Kochia Cannonii*, *Pimelea Williamsonii*, and *Goodenia vernicosa*.—J. H. Faull.

2226. BLACK, J. M. Additions to the flora of South Australia. No. 16. Trans. and Proc. Roy. Soc. South Australia 43: 349-354. Pl. 32. 1919.

2227. CHANCEREL, LUCIEN. Flore forestière du globe. [Forest flora of the world.] 16.5 × 25 cm., 738 p. Gauthier-Villars et Cie.: Paris, 1920.—The avowed purpose of this work is to describe, scientifically and practically, the principal trees of the world and to indicate (1) their botanical and sylvan characteristics, (2) their geographical distribution and habitats, (3) their soil preferences, (4) the different races of each species, (5) the characters and properties of their woods, (6) their various products, (7) their cultural uses, and (8) their diseases and their enemies. The commoner or more generally known trees, shrubs, and vines native to all parts of the world are treated according to the above headings with more or less detail.—E. B. Payson.

2228. COULTER, J. M. Flora of District of Columbia. [Rev. of: HITCHCOCK, A. S., and P. C. STANDLEY. Flora of the District of Columbia and vicinity. Contrib. U. S. Nation. Herb. 21: 1-329. 42 pl. 1919 (see Bot. Absts. 4, Entry 1731).] Bot. Gaz. 68: 487. 1919.

2229. COULTER, J. M. New African plants. [Rev. of: MOORE, SPENCER LeM. *Alabastra diversa*. XXXI. 1. Miscellanea Africana. Jour. Botany 57: 212-219, 244-251. 1919 (see Bot. Absts. 3, Entry 3003; 4, Entry 1748).] Bot. Gaz. 68: 488. 1919.

2230. HOLMBOE, JENS. Den botaniske eksursion i Bergens shjargaerd efter det 16 de skandinaviske naturforskermöte 17 de og 18 de juli 1916. [The botanical excursion among islands near Bergen after the 16th meeting of the Scandinavian naturalists July 17-18, 1916. Bergens Mus. Aarbok Naturv. Raekke 1917-1918⁶: 31 p. 1920.—The contribution includes: Notes on vascular plants, with list; *Taraxacum schizophyllum* Dahlst., n. sp.; and a list of bryophytes and lichens.—A. Gundersen.

2231. HOUSE, HOMER D. Wild flowers of New York. New York State Mus. Mem. 15. 362 p., 264 quadricolor photo pl., 35 fig. 1918 [1920].—The author has presented a treatment of the wild flowers of New York similar in purpose and scope to Fuyentes' "Birds of New York," but while the colored plates of the latter were reproduced from original paintings by Fuyentes, in the present memoir all illustrations are from photographs, 35 species being shown in black and white half tone and 364 species in natural colors by the quadricolor process. In this process, from black and white photographs taken in the field, "four plates were made to print respectively yellow, red, blue, and black, the latter to give shade and depth to picture. With a lumiere photograph as guide (this having been taken in the field at same time as black and white photos) the other 3 plates were etched down to print each its respective color in the correct proportion and position. These plates set up in press and printed in sequence, yellow, blue, red, black, in perfect register give the quadricolor process picture." Of the 402 species illustrated, nearly all are herbaceous, there being only a few shrubs (*Ericaceae* notably) and no trees. Numerous foreign species now run wild in this territory are included. Eighty-

eight families (following Britton and Brown, 2nd ed., are represented, many by only a single species, but of the order Liliales 26 species are shown, of the orchid family 28 (thus reflecting the popular interest in this group), of the buttercup family 22, and of Rosales as a whole 44 species. The genus *Viola* is fully represented by 17 species while of the order Ericales there are 20, of mints 13, of the Scrophulariaceae 17, and of composites in the broad sense 50 species. Descriptive text accompanies the plates and figures, all being printed on uniform medium weight coated paper. Common names are given in dark faced type followed by the scientific name in italics. A paragraph of technical description, another of habitat relations, geographical distribution, flowering data, and frequency. Frequently also data as to related genera or species are given and, in some cases, items of general information or historical interest are added. Keys to more difficult or larger genera are included; as in *Polygala*, *Viola*, and *Aster*. The text and plates are preceded by 23 pages of descriptions of plant structures for the aid of persons not trained in the use of manuals—a sort of illustrated glossary with 95 cuts adapted from Gray's Lessons in Botany.—W. L. Bray.

2232. MOSS, C. E. The Cambridge British flora. Vol. 3, xvi + 200 p., 191 pl. University Press: Cambridge [England], 1920.—The present volume continues this well known work on the same plan as the previous volumes; it includes the families Portulacaceae to Fumariaceae. Outstanding features of the work are: A very full bibliography and synonymy, outline maps showing the distribution of species, a recognition and differentiation of many varieties, subvarieties, forms, and hybrids, several of which are indicated as new or new combinations.—J. M. Greenman.

2233. RICE, BERTHA M., AND ROLAND RICE. Popular studies of California wild flowers. 8 vo., 127 p., 34 illustrations from photographs. Upton Bros. & Delzelle: San Francisco, 1920.—The title of this volume well characterizes the work. The authors have presented in popular more or less poetic style some of the attractive Californian wild flowers.—J. M. Greenman.

2234. STONE, HERBERT. A guide to the identification of our more useful timbers, being a manual for the use of students of forestry. 8 vo., viii + 52 p., 3 pl. Cambridge University Press: London, 1920.

2235. TAYLOR, NORMAN. [Rev. of: BRITTON, N. L., AND C. F. MILLSPAUGH. The Bahama Flora. viii + 695 p. Published by the authors: New York, 1920 (see Bot. Absts. 7, Entry 1429).] Torreya 20: 124, 125. 1920.

PTERIDOPHYTES

2236. HIERONYMUS, G. Bemerkungen zur Kenntnis der Gattung *Angiopteris* Hoffm., nebst Beschreibungen neuer Arten und Varietäten derselben. [The genus *Angiopteris* with descriptions of new species and varieties.] Hedwigia 61: 242-285. 1919.—The following new species from the Orient are described: *Angiopteris Naumannii*, *A. novocaledonica*, *A. papandayanensis*, *A. Cumingii*, *A. Henryi*, *A. elongata*, *A. Oldhami*, *A. boninensis*, *A. palauensis*, *A. Boivini*, *A. Fauriei*, *A. fokiensis*, *A. yunnanensis*, *A. caudatiformis*, *A. Sakuraii*, *A. oschimensis*, and *A. oligothea*. Several new varieties are included.—D. Reddick.

SPERMATOPHYTES

2237. ALLEN, MARION E. The supposed generic character of *Naumburgia*. Rhodora 22: 193-194. 1920.—By some botanists *Lysimachia thyrsiflora* has been separated from *Lysimachia*, as a genus *Naumburgia*, on the ground of the small, tooth-like staminodia in the sinuses of the corolla. A number of dissections of both American and foreign material in the Gray Herbarium showed that the American specimens were consistently characterized by an absence of staminodia, and that they were wanting in a majority of cases in the Eurasian material. Thus *Naumburgia* Moench, as a genus distinct from *Lysimachia*, falls to the ground. The plant with teeth is probably a variation.—James P. Poole.

2238. BAAS BECKING, L. H. *Staphylea colchica* Stev. var. *laxiflora* n. var. Mededeel. Landbouwhoogeschool Wageningen 17: 83-89. Pl. 6-7. 1920.

2239. BLACK, J. M. A revision of the Australian *Salicornieae*. Trans. and Proc. Roy. Soc. South Australia 43: 355-367. Pl. 33-37. 1919.—Four genera are included in the present revision, namely, *Arthrocnemum*, *Pachycornia*, *Salicornia*, and *Tecticornia*. One new variety, *A. halocnemoides* Nees var. *pergranulatum*, is described; *A. Lylei* (*Salicornia* Ewart & White) and *P. tenuis* (*Salicornia tenuis* Benth.) appear as new combinations.—J. H. Faull.

2240. BRADSHAW, R. V. A new Oregon *Eucephalus*. *Torrey* 20: 122, 123. 1920.—*Eucephalus vialis* n. sp., collected on rocky hillsides at Eugene, Oregon, is described. The species seems nearest to *E. Engelmannii* (Gray) Greene, from which it differs chiefly in the smaller rayless heads, with narrower and more glandular involucre bracts.—J. C. Nelson.

2241. BRANDEGEE, TOWNSHEND STITH. *Plantae Mexicanae Purpusianae*, X. Univ. California Publ. Bot. 7: 325-331. Dec 29, 1920.—The author describes 1 new genus and 18 new species. The new genus is *Pachystelma* (gen. nov. Asclepiadacearum). All new species with one exception are named by the author as follows: *Hechtia glabra*, *H. Purpusii*, *Ocotea pyramidata* Blake, *Bauhinia jucunda*, *Indigofera acasonicae*, *Eriosema nigropunctatum*, *Esenbeckia ovata*, *Euphorbia consoquillae*, *Jatropha longepedunculata*, *Ayenia Purpusii*, *Maba Purpusii*, *Sideroxylon campestre*, *Dictyanthus prostratus*, *Polystemma rupestre*, *Pachystelma cordatum*, *Cynanchum racemosum*, *Solanum molestum*, and *Viguiera pauciflora*.—W. A. Setchell.

2242. CHEEL, EDWIN. Notes on three species of *Melaleuca*. Trans. and Proc. Roy. Soc. South Australia 43: 368-372. Pl. 38. 1919.—Critical notes are recorded on *Melaleuca pustulata* Hook f., *M. halmaturorum*, and *M. pauperiflora* F. v. M.—J. H. Faull.

2243. COULTER, J. M. Tropical American plants. [Rev. of: BLAKE, S. F. (1) The genus *Homalium* in America (see Bot. Absts. 5, Entry 2370). (2) New South American spermatophytes collected by H. M. Curran (see Bot. Absts. 5, Entry 2371). Contrib. U. S. Nation. Herb. 20: 221-235, 237-245. 1919.] Bot. Gaz. 68: 488. 1919.

2244. COULTER, J. M. New species of *Vernonia*. [Rev. of: GLEASON, H. A. Taxonomic studies in *Vernonia* and related genera. Bull. Torrey Bot. Club 46: 235-252. 1919 (see Bot. Absts. 5, Entry 2381).] Bot. Gaz. 68: 488. 1919.

2245. COULTER, J. M. New names. [Rev. of: MACBRIDE, J. FRANCIS. (1) Notes on certain Leguminosae. (2) Reclassified or new spermatophytes. Contrib. Gray Herb. Harvard Univ. N. S., 59: 1-27, 28-39. 1919 (see Bot. Absts. 4, Entry 1743).] Bot. Gaz. 68: 488. 1919.

2246. COULTER, J. M. [Rev. of: (1) ROCK, J. F. The arborescent indigenous legumes of Hawaii. Hawaii Bd. Agric. and Forest. Bot. Bull. 5. 53 p., 18 pl. 1919 (see Bot. Absts. 4, Entry 1763). (2) ROCK, J. F. The Hawaiian genus *Kokia*. Hawaii Bd. Agric. and Forest. Bot. Bull. 6. 22 p., 7 pl. 1919 (see Bot. Absts. 4, Entry 1764). (3) KOIDZUMI, GENITI. Contributiones ad floram Asiae Orientalis. Bot. Mag. Tôkyô 33: 110-129. 1919 (see Bot. Absts. 4, Entry 1734).] Bot. Gaz. 68: 487. 1919.

2247. COULTER, J. M. New tropical American plants. [Rev. of: STANDLEY, P. C. Studies of tropical American phanerogams. Contrib. U. S. Nation. Herb. 20: 173-220. 1919 (see Bot. Absts. 5, Entry 2398).] Bot. Gaz. 68: 487. 1919.

2248. FERNALD, M. L. Brainerd and Peitersen's Blackberries of New England. [Rev. of: BRAINERD, EZRA, AND A. K. PEITERSEN. Blackberries of New England—their classification. Vermont Agric. Exp. Sta. Bull. 217. June, 1920 (see Bot. Absts. 8, Entry 223).] *Rhodora* 22: 185-191. 1920.

2249. HALL, HARVEY MONROE. *Chrysothamnus nauseosus* and its varieties. [Part I of: HALL, H. M., AND THOMAS HARPER GOODSPEED. A rubber plant survey of northwestern North America.] Univ. California Publ. Bot. 7: 159-181. Nov. 7, 1919.—The author undertakes to deal with the botanical relationships of the species of *Chrysothamnus* concerned. There is given a key to the sections of the genus and then one to the 22 varieties of *Chrysothamnus nauseosus* (Pall.) Britt. The new varieties and new combinations treated under the species are as follows: var. *hololeucus* (Gray), var. *latisquameus* (Gray), var. *salicifolius* (Rydb.), var. *gnaphalodes* (Greene), var. *speciosus* (Nutt.), var. *frigidus* (Greene), var. *plattensis* (Greene), var. *bernardinus*, var. *Bigelovii* (Gray), var. *glareosus* (M. E. Jones), var. *leiospermus* (Gray), var. *californicus* (Greene), var. *ceruminosus* (Dur. & Hilg.), var. *oreophilus* (A. Nels.), var. *pinifolius* (Greene), var. *consimilis* (Greene), var. *viridulus*, var. *mohavensis* (Greene), and var. *junceus* (Greene).—W. A. Setchell.

2250. JUMELLE, HENRI. Le Katoka, arbre a graines comestibles de Madagascar. [The katoka, a tree of Madagascar bearing edible seeds.] Compt. Rend. Acad. Sci. Paris 171: 924-926. 1920.—The katoka is the seed of a tree of a new species of *Treculia*, named *T. Perrieri* sp. nov. It is related to the jackfruit and breadfruit and is found in western Madagascar. A description of the plant is given.—C. H. Farr.

2251. KRÄNZLIN, FR. Beiträge zur Kenntnis der Gattung Telipogon HBK. [Contributions to a knowledge of the genus Telipogon.] Ann. Naturhist. Mus. Wien 33: 9-38. 1920.—There is a historical introduction to the account of this orchidaceous genus, a key to the 53 species, followed by descriptions of each. The following are described as new: *T. minutiflorus* (Costa Rica), *T. Sprucei* (Ecuador), *T. christobalensis* (Costa Rica), *T. Endresianum* (Costa Rica), *T. buenavistae* (Costa Rica), *T. buenaventurae* (Colombia), *T. Kalbreyerianus* (Colombia).—A. S. Hitchcock.

2252. MAIDEN, J. H. Notes on Tasmanian Eucalypts. Papers and Proc. Roy. Soc. Tasmania 1918: 82-90. 1919.

2253. RIDLEY, H. N. New Malayan plants. Jour. Botany 58: 147-149, 195-196. 1920.—The genera *Peripetasma* (Menispermaceae) and *Scaphocalyx* (Flacourtiaceae) are described as new, and the following new species are proposed: *Peripetasma polyanthum*, *Tinospora Curtisii*, *Scaphocalyx spathacea*, *S. parviflora*, and *Entada Schefferi*.—K. M. Wiegand.

MISCELLANEOUS, UNCLASSIFIED PUBLICATIONS

B. E. LIVINGSTON, *Editor*
S. F. TRELEASE, *Assistant Editor*

2254. ANONYMOUS. Note. [Rev. of: SAUVAGEAU, CAMILLE. Utilisation des algues marines. [Utilization of marine algae.] Encyclopédie Scientifique: Bibliothèque de Botanique Appliquée. vi + 394 p. Octave Doin: Paris, 1920 (see Bot. Absts. 8, Entry 604).] Nature 106: 435. 1920.

2255. BARNARD, J. E. Microscopy with ultra-violet light. Nature 106: 378-381. 5 fig. 1920.—Description of apparatus used by author (essentially same as devised by KOHLER); illustrations of apparatus, photomicrographs of *Saccharomyces Pastorianus* and *Bacillus anthracis* by dark ground illumination compared with that by ultra-violet light.—O. A. Stevens.

2256. COTTERELL, K. W. Production of peat in 1919. Jour. Amer. Peat Soc. 14: 7-14. 1921.—The total production of peat in the United States in 1919 was 69,197 short tons, valued at \$705,532. The products from it were utilized as fertilizer and fertilizer filler, fuel, and as an ingredient of stock food. Carbonized peat is used for the latter purpose and it is not claimed to have "any particular nutritive value."—G. B. Rigg.

2257. CROSSLEY, A. W. Industrial research associations. III. The British Cotton Industry Research Association. *Nature* 106: 411-413. 1920.—Organization and outline of investigational work are described.—*O. A. Stevens.*

2258. F., H. B. The Bulawayo meeting of the South African Association. *Nature* 106: 388-389. 1920.—A review of the presidential address by I. B. POLE EVANS, "The Veld: its resources and dangers," and briefer notes of other botanical papers are presented.—*O. A. Stevens.*

2259. KAISER, GEORGE B. Little journeys into mossland. II. A February thaw. *Bryologist* 24: 5-6. 1921.—This is an informal account of a botanical ramble in search of mosses along Wissahickon Creek, Philadelphia.—*E. B. Chamberlain.*

2260. LAMBERT, F. La sericulture et les aveugles. [Silk culture and the blind.] *Ann. École Nation. Agric. Montpellier* 17: 105-119. *Fig. 1-10.* 1918 [1919].—It is shown that the greater part of the work pertaining to silk culture can be satisfactorily performed by blind persons.—*F. F. Halma.*

2261. MILLS, D. GORDON. The protection of wildflowers. *Jour. Bot. Soc. South Africa.* 6: 14-16. 1920.

2262. MYERS, J. L., AND H. H. TURNER. The British Association. *Nature* 106: 277-279. 1920.—A discussion of the place and management of meetings.—*O. A. Stevens.*

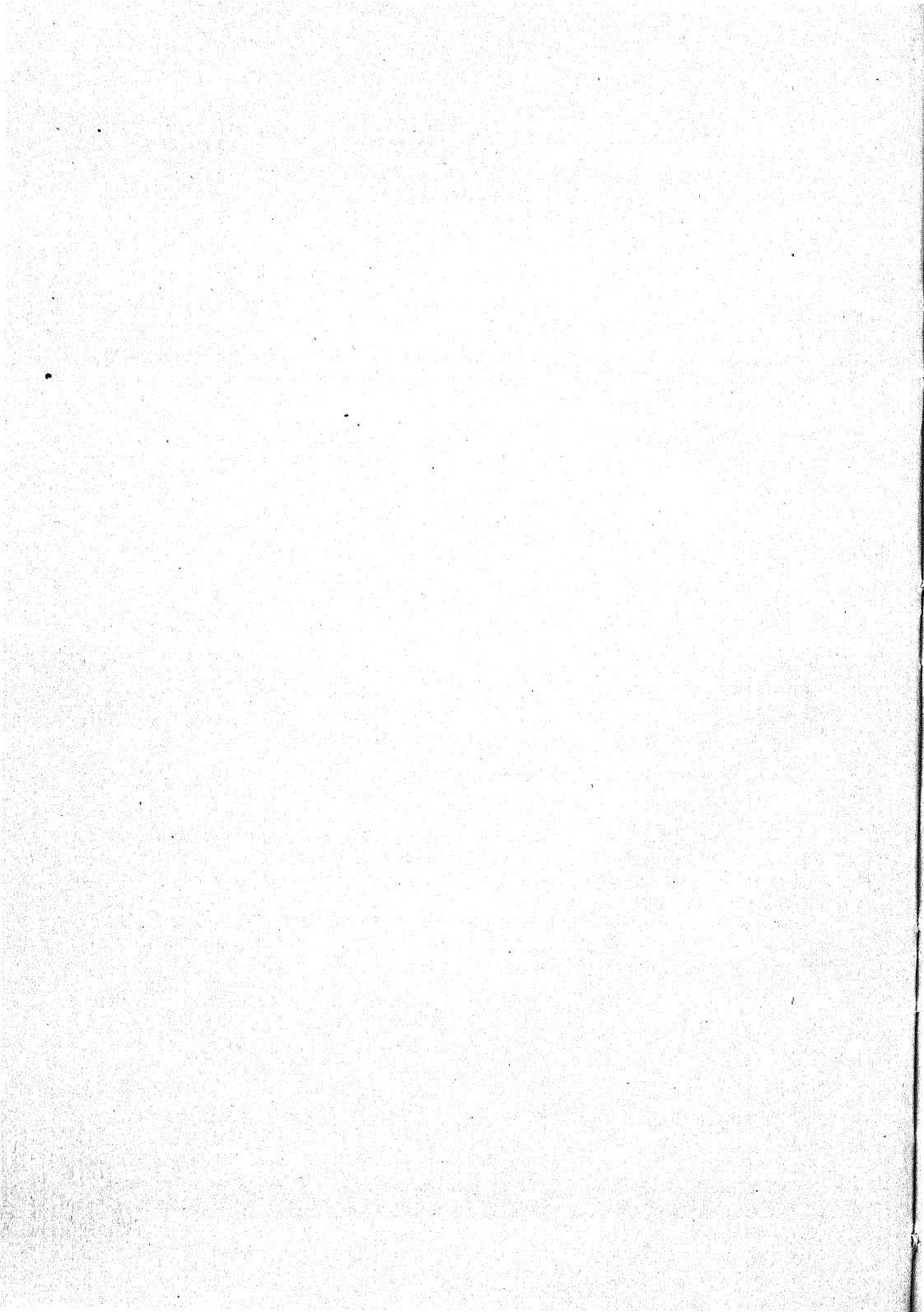
2263. PAMMEL, L. H. Some economic phases of botany. *Science* 53: 4-15. 1921.—In his address before Section G of the American Association for the Advancement of Science, Chicago, 1920, the writer reviews the work of earlier investigators and points out its bearing on the problems of the present and the future. The work is reviewed under the following headings: Plant pathology; pollination of flowers; plant breeding; seed studies; grasses; weeds; erosion; and aquatic farming. The plea is presented that botanists should enter more vigorously into the exploration of fields of agronomy, ecology, and taxonomy as they are related to agriculture and horticulture.—*A. H. Chivers.*

2264. STANFORD, R. V. The British Association. *Nature* 106: 279-280. 1920.—Discussion of place and management of meetings.—*O. A. Stevens.*

2265. STOELTZER, W. Ueber Alaunhämatoxylin. [Concerning alum haematoxylin.] *Centralbl. Allg. Pathol.* 30: 290-291. 1919.—The author describes the chemistry and staining properties of alum haematoxylin.—*E. C. Stakman.*

2266. WATERS, C. E. The society for the prevention of the wild. *Amer. Fern Jour.* 10: 115-119. 1920.—The article is a plea for the preservation of wild plants, especially of ferns.—*F. C. Anderson.*

2267. WOODS, A. F. The future of agricultural science in the American Association for the Advancement of Science. *Science* 53: 27-29. 1921.—While much has been accomplished in agricultural investigation in the past, what may rightly be termed the scientific phase of agricultural development is just being entered upon. If we are to feed and clothe the increasing population of the world and still retain some time for culture and recreation we shall need to conduct scientific research in all fields to an extent hitherto unknown.—*A. H. Chivers.*



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